Social Studies Teaching III:

Integrating Technology into the Social Studies

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SOCIAL STUDIES TEACHING III: Integrating Technology into the Social Studies

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FOREWORD

In Chapter 1, technology standards for teachers and students are discussed in detail. In this direction, the frameworks offered by different countries or organizations for standards were evaluated.

Chapter 2 introduced three frequently referenced technology integration models, TPACK, SAMR and LoTi, were introduced with a critical discussion of their philosophical and pedagogical foundations as well as their strengths and challenges as identified in the related literature. It also reviewed the empirical research conducted in the last ten years on these models within the context of social studies education. The chapter revealed the potentials of regarding frameworks germane to social studies education.

Chapter 3 delves into these challenges, offering insights into their roots and practical strategies for addressing them. It highlights how tailored technological solutions can enrich learning experiences while advocating for equitable access and comprehensive teacher support. By bridging the gaps in technology integration, educators can ensure that all students benefit from the transformative potential of digital tools in education.

Chapter 4, the link between technology integration in education and professional development is discussed in detail. In this respect, focusing on the role of teachers in the process of technology integration, it is emphasized that the success of this process depends on equipping teachers with technological pedagogical knowledge and skills and quality professional development programs.

In Chapter 5, technology integration in digital classrooms was discussed, and then applications that would constitute examples of this were presented in relation to social studies teaching.

Chapter 6: Social studies education is becoming increasingly interactive, participatory, and student-centered through the opportunities offered by technology. This study, titled "Technology Integration in Social Studies: Why It Is Necessary," underscores the importance of the strategic and deliberate use of technology in social studies courses.

In Chapter 7, information is given about the role and usage areas of electronic book technology in social studies education. The advantages and development of e-books in the field of education are mentioned.

Chapter 8: The subject of creativity and innovation in education has a long history. This subject, which has come to the fore again with the 21st century skills movement, has a special value in terms of social studies. In this section, creativity and innovation skills are discussed in detail and their relationship with social studies is tried to be presented with a sample activity.

In Chapter 9, critical thinking and problem solving are discussed in detail. In this direction, the frameworks offered by different countries or organizations for standards were evaluated.

In Chapter 10, it is emphasized that communication skills are critical for success in all areas of life in the 21st century. It is stated that the use of online communication channels in the realization of educational goals today positively supports social studies course quality and student achievement, and a sample activity that can serve as a reference for teachers is included.

In Chapter 11, collaboration skill is mentioned as one of the key learning and innovation skills of the 21st century. It is stated that collaboration skill, which is also included in the social studies curriculum, plays an important role in helping individuals understand and actively participate in the basic dynamics of social life, and the chapter is completed with a sample activity.

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Özkan AKMAN

PART I- TECHNOLOGY INTEGRATION IN EDUCATION

Chapter 1 - Technology Standards for Teachers and Students

Özkan AKMAN

Elif IŞIK

Chapter Highlights

- Understand the ability to meet the individual learning needs of students using technology.
- Master skills such as computer use, internet research and basic use of digital tools in social studies education.
- Enable students to approach topics such as history, geography, economics and culture from a more in-depth and innovative perspective.

1. Introduction

Technology standards for teachers and students are set to ensure the effective and efficient use of technology in education. These standards are usually developed and updated by educational institutions and educational policy-making organizations. Broadly speaking, technology standards for teachers and students can be categorized into two categories.

2. Technology Standards for Teachers

Technology standards for teachers can be categorized into six categories.

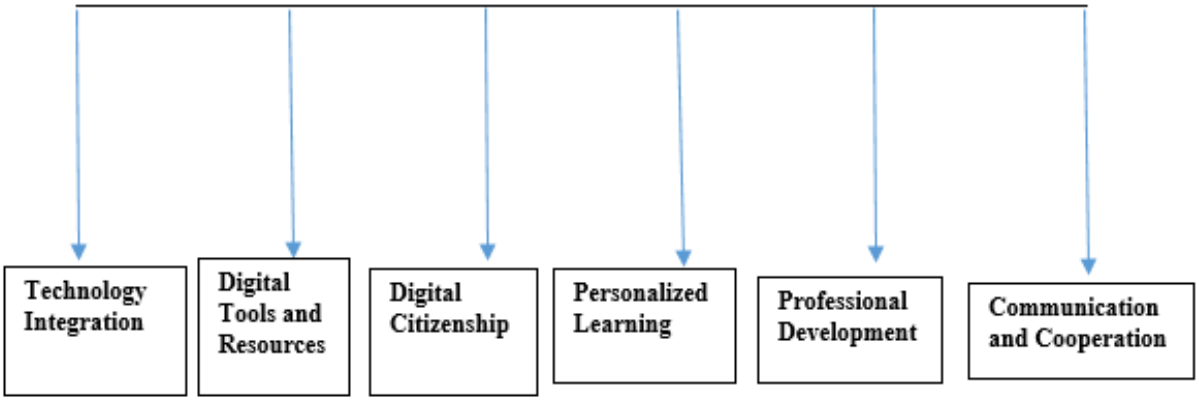

Figure 1: Technology standard tree for teachers

2.1. Technology Integration

Technology integration is an effort to improve teaching and learning through the systematic and deliberate use of technology in the educational process (Okojie, Olinzock, & Okojie-Boulder, 2006). This approach requires integrating technology into the school curriculum in such a way that it is not just an adjunct or enabler, but also central to the educational experience (Davies, & West, 2014). Technology integration aims to increase student engagement and make learning experiences more engaging by enriching teachers' lesson plans with digital tools and resources (Mills & Tincher, 2003). The first step for technology integration in a classroom is to identify technologies that are compatible with instructional goals (Howley, Wood, & Hough, 2011). By using these technologies, teachers can make course content more accessible, interactive and student-oriented (Schoepp, 2005). For example, various tools such as digital presentation tools, interactive whiteboards, online learning platforms, and simulations are effective in addressing students' different learning styles (Harrell & Bynum, 2018).

Another important aspect of technology integration is that it increases student engagement and creates opportunities for collaborative learning (Zhao, 2007). Students can exchange ideas and work

on collaborative projects through online discussion boards or sharing platforms (Schoepp, 2005). Such applications provide students with the opportunity to become not only consumers of knowledge but also producers of knowledge (Kimmons, Graham, & West, 2020). Furthermore, technology integration offers the possibility to better respond to the needs of students with different abilities. For example, personalized learning experiences can be provided for students with special educational needs by using adaptive learning software and assistive technologies (Mills & Tincher, 2003).

2.2. Digital Tools and Resources

The ability to recognize and evaluate digital tools and resources that can be used in education has become an integral part of modern teaching strategies (Ibeh, Awonuga, Okoli, Ike, Ndubuisi & Obaigbena, 2024). This ability is critical for educators in today's rapidly evolving technological world (Akram, Abdelrady, Al-Adwan & Ramzan, 2022). Teachers need to examine and evaluate a multitude of digital tools to make their students' learning experiences more effective and diverse (Williams, Christensen, McElroy & Rutledge, 2023). The process of recognizing digital tools and resources begins with teachers identifying the technologies that best suit their educational goals (Schmitz, Antonietta, Consoli, Cattaneo, Gonon & Petko, 2023). These tools should be able to respond to a variety of educational needs. For example, they can offer specific solutions such as language apps for language learning, virtual museum visits for history lessons, simulations for science, and platforms with interactive problems for mathematics (Bereczki & Kárpáti, 2021).
However, the evaluation of these tools and resources is as important as their recognition. Teachers should carefully examine the suitability, accessibility and reliability of the digital tools they intend to use for educational purposes (Tondeur, Petko, Christensen, Drossel, Starkey, Knezek & Schmidt-Crawford, 2021). In addition, it should be taken into account that the selected tools should ensure student confidentiality and data security (Williams, et al., 2023). Moreover, in this evaluation process, teachers should pay attention to student feedback. Students' interactions with the tools provide valuable information about their contribution to the learning process. Based on student experiences, teachers can develop different strategies to improve or enhance the effectiveness of digital tools (Akram, et al., 2022).

2.3. Digital Citizenship

Raising students as informed and ethical digital citizens is vital in today's digital world to ensure that they can interact safely and responsibly on social media and other online platforms (Fernández-Prados, Lozano-Díaz & Ainz-Galende, 2021). The primary goal of this education is to provide students with the knowledge and skills needed to understand the opportunities and risks they may face in the digital environment (Öztürk, 2021). Digital citizenship education should enable students to understand their online rights and responsibilities (Pangrazio & Sefton-Green, 2021). This

process helps students become aware of issues such as digital privacy, online security and protection of personal information (Öztürk, 2021). It also develops critical thinking skills such as combating misinformation and evaluating the reliability of sources (Pangrazio & Sefton-Green, 2021).

An important part of this education is to teach the ethical dimension of online behavior. Students should be taught the importance of respectful and empathetic communication in the digital world (Milenkova & Lendzhova, 2021). This includes ethical values such as avoiding cyberbullying and respecting other people's different opinions. Students should learn how they can leave a positive mark online and how they can have a positive impact on others. Digital citizenship education should also encourage students to use their digital creativity and skills for positive purposes (Al-Abdullatif & Gameil, 2020). Students can engage in constructive activities such as social responsibility projects or community development. This helps them to become more active and contributing individuals online (Pangrazio & Sefton-Green, 2021). Effective digital citizenship education should be delivered in a naturally interactive and dynamic way in a technology-infused learning environment (Fernández-Prados, et al., 2021). In guiding this, teachers can create space for students to question and learn from their own digital experiences.

2.4. Personalized Learning

The ability to meet students' individual learning needs using technology is one of the keys to providing a customized and student-centered learning experience in today's educational world (El-Sabagh, 2021). Since each student has different learning speeds, interests and abilities, technology can offer flexible solutions that accommodate this diversity. Digital tools and platforms allow students to progress at their own pace and adapt learning materials to their needs (Alamri, Lowell, Watson & Watson, 2020). For example, adaptive learning software offers a personalized education by adjusting to the student's strengths and weaknesses (Alamri, Watson & Watson, 2021). Such tools allow students to practice more in the subjects they are lacking in, while directing them to more advanced resources in their areas of strength.

Online education platforms offer a wide range of learning materials, giving students the opportunity to gain in-depth knowledge on topics of interest. Resources such as video lectures, interactive simulations and virtual laboratories give students the chance to apply theoretical knowledge in a practical way (Bernacki, Greene & Lobczowski, 2021). Moreover, another important advantage of technology is that it speeds up and personalizes feedback processes. Students can receive immediate feedback through online quizzes and assessment tools (Alamri, et al., 2020). This allows them to monitor their own learning progress more closely and to recognize and correct their shortcomings immediately. Learning technologies also facilitate students' ability to participate in a more collaborative learning environment (Bernacki, et al., 2021). Various digital platforms allow students to do projects together, share information and learn from each other, which supports social learning

processes (El-Sabagh, 2021).

2.5. Professional Development

Using technology for continuous professional development offers important possibilities to enable educators and other professionals to continuously update and improve their knowledge and skills throughout their careers (Sancar, Atal & Deryakulu, 2021). Thanks to the various tools and platforms offered by technology, professional development has become more accessible and flexible than ever before (Fernández-Batanero, Montenegro-Rueda, Fernández-Cerero & García-Martínez, 2022; Alwaely, El-Zeiny, Alqudah, Alamarnih, Salman, Halim & Khasawneh, 2023). Online courses and web-based learning platforms offer a wide range of educational materials and modules for individuals seeking to deepen their expertise in different disciplines (Leary, Dopp, Turley, Cheney, Simmons, Graham, & Hatch, 2020). Such platforms often provide flexible timeframes and the ability to move at your own pace, making them ideal solutions for professionals with busy schedules. Webinars and virtual conferences offer opportunities to interact with experts and keep up with the latest trends and innovations in the industry. These events give participants a global perspective, providing a learning experience enriched by ideas from different geographies. Social media and online professional networks allow individuals to connect and share experiences with other professionals in their field (Kilag, Bariquit, Glipa, Ignacio, Alvez, Guilot & Sasan, 2023). These platforms offer a dynamic environment to engage in industry-related discussions, share resources and seek advice from peers.

Furthermore, digital tools can help professionals to continuously evaluate and improve their teaching or working practices. For teachers, technologies such as software that analyzes student performance data, classroom management tools and digital feedback systems can be used to improve the effectiveness of pedagogical strategies (Alwaely, et al., 2023). Another important aspect enabled by technology is micro-learning opportunities (Kilag, et al., 2023). Short and focused training modules can be easily completed even during busy workdays. Such learning methods provide quick and effective access to information when it is needed.

2.6. Communication and Cooperation:

The ability to communicate and cooperate through digital platforms is of paramount importance in today's rapidly changing and globalized world (Karalis & Raikou, 2020). Technological advances allow individuals and teams to communicate and collaborate effectively across geographical boundaries (Thornhill-Miller, Camarda, Mercier, Burkhardt, Morisseau, Bourgeois-Bougrine, ... & Lubart, 2023). These capabilities have become critical for the success and efficiency of projects, especially in business and education. Digital platforms offer individuals and groups a variety of communication tools. Email, instant messaging applications, video conferencing

services and project management software enable people to exchange information and coordinate work processes. These tools create flexible work environments by eliminating the need to physically coexist (Kayoe, & Godwin, 2023).

In terms of collaboration, digital platforms allow teams to work more effectively towards common goals. Functions such as cloud storage and simultaneous organization of documents enable teams to share and organize information in real time (Karalis & Raikou, 2020). This results in faster feedback loops and decision-making processes. Another key advantage of digital communication and collaboration tools is the ability to share and create content in a variety of formats (Thornhill-Miller, et al., 2023). Visual, audio and text-based content appeals to different communication styles and learning styles, which increases interaction and understanding (Kayoe, & Godwin, 2023). However, when communicating through digital platforms, it is important to observe basic communication skills such as listening effectively and expressing clearly and concisely, as well as digital ethics and courtesy. Adopting a correct and constructive attitude online directly affects the quality of collaboration and the success of the results (Karalis & Raikou, 2020).

3. Technology Standards for Students

Technology standards for students can be categorized into six categories.

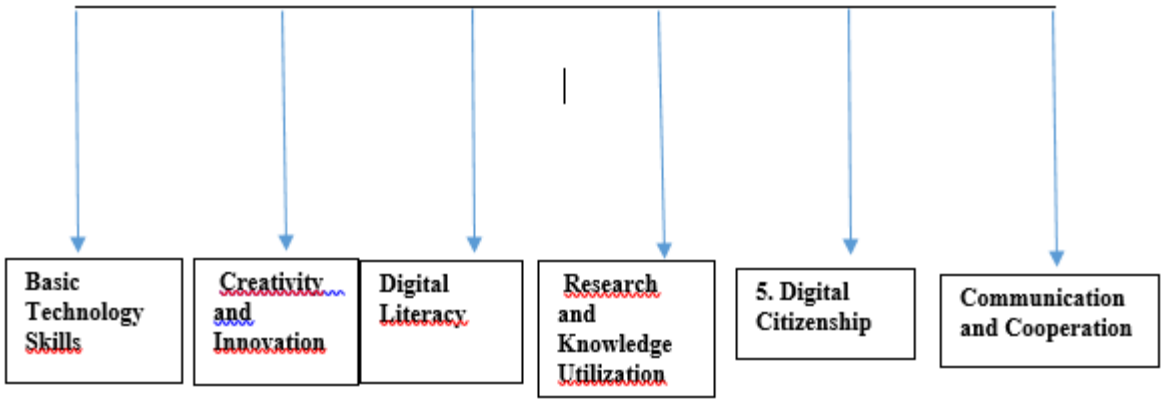

Figure 2: Technology standard tree for students

3.1. Basic Technology Skills

In terms of social studies education, mastering skills such as computer use, internet research, and basic use of digital tools enables students to both increase their academic achievement and gain the digital competencies required by the 21st century (Atasoy, Banker, & Pavlou, 2021). Developing these skills makes social studies lessons more interactive, engaging, and connected to contemporary life (Khamchai, Sriprasertpap, & On-ming, 2022). The use of computers has become a cornerstone of social studies education (Sailer, Stadler, Schultz-Pernice, Franke, Schöffmann, Paniotova, ... &

Fischer, 2021). Using computers, students can access various multimedia resources, create written documents and prepare digital projects (Yılmaz, 2021). While this process increases their technological literacy, it also strengthens their creativity and critical thinking skills (Korkmaz, Çakır & Erdoğmuş, 2021).

Internet research offers the opportunity to gain in-depth knowledge in social studies learning. Students can conduct detailed research on historical documents, statistical data and current events through online databases, digital libraries and reliable information sources (Korkmaz, et al., 2021). Research on the Internet helps students develop critical skills in accessing accurate information, evaluating information, and questioning the reliability of sources (Khamchai, et al., 2022). The use of digital tools enriches and diversifies social studies lessons (Yılmaz, 2021). Mapping software, virtual tour applications and simulations help make geography and history topics more vivid and understandable (Sailer, et al., 2021). Students can explore the past and different cultures more effectively by organizing activities such as virtual museum visits (Atasoy, Banker, & Pavlou, 2021). These digital skills also improve students' collaboration and communication abilities. By using online platforms for group projects, they can collaborate, exchange ideas, and gain experience in problem solving together (Korkmaz, et al., 2021). Such collaborative work allows students to gain a deeper understanding of social studies concepts and apply this knowledge in daily life (Khamchai, et al., 2022).

3.2. Creativity and Innovation

Creativity and innovation in social studies education enable students to approach topics such as history, geography, economics, and culture from a more in-depth and innovative perspective (Lee, Legood, Hughes, Tian, Newman, & Knight, 2020). Fostering creativity and developing innovative thinking enriches education in this area and makes students more effective problem solvers and critical thinkers.

Creativity allows for making new and meaningful connections by combining various elements of social studies education. For example, students can write dramas to re-enact historical events, create artistic projects that represent cultural elements of a period, or produce short films that address different social issues (Sawu, Sukarso, Lestari, & Handayani, 2023; Tamsah, Ilyas, & Yusriadi, 2021). Such creative activities help students not only learn knowledge, but also reinterpret it and gain a personal perspective (Newman, Round, Wang, & Mount, 2020).

Innovation involves bringing innovative approaches to the problems and issues addressed in social studies education. Students can develop creative solutions to solve social, political or environmental problems in today's world. For example, they can design innovative projects on sustainable urban planning, methods to combat climate change, or social equity. This kind of work prepares students to become individuals who can respond effectively to the challenges they face in society (Sawu, et

al., 2023). Technology integrated into social studies lessons also offers many opportunities for creativity and innovation. Digital storytelling, interactive maps and virtual reality-based explorations enable students to learn topics in a more engaging and interactive way. In addition, international student networks and online collaborations can be used to encourage innovative thinking on global issues (Lee, et al., 2020). Teachers should provide flexible and student-centered learning environments to develop their students' creativity and innovation capacities (Tamsah, et al., 2021). Methods such as open-ended problems, project-based learning and interdisciplinary studies give students the opportunity to explore their own paths and express their ideas freely (Newman, et al., 2020).

3.3. Digital Literacy

While social studies courses contribute to students' understanding of social events, historical processes, and geographical information, they also enable the development of a variety of skills necessary for them to be effective individuals in today's world (Anisimova, 2020). These include the ability to analyze, evaluate, and create digital content in accordance with the technology standards required by the digital age (Park, Kim, & Park, 2021).

Students frequently interact with the information they encounter on digital platforms (Çetin, 2021). In this context, analyzing digital content develops students' critical thinking skills. Critical thinking involves students questioning the sources of digital content, its accuracy, objectivity, and reliability (Mudra, 2020). By comparing information from different sources, students can make informed judgments about the reliability of information. This process enables them to access accurate information and avoid misleading content in online environments. The evaluation phase involves students not only analyzing information, but also understanding the context of that information and its use (Çetin, 2021). Digital media literacy allows students to evaluate information from social and cultural perspectives and determine which information is more valid or appropriate. This encourages students to understand different perspectives and think critically (Anisimova, 2020).

The capacity to create digital content provides students with opportunities to creatively express their knowledge and projects (Park, et al., 2021). Students can create presentations, infographics, videos or multimedia projects using various digital tools and software (Çetin, 2021). This process develops both their technical skills and creative thinking abilities. In addition, digital content requires effective and clear communication to reach a wide audience. This strengthens students' communication skills (Anisimova, 2020).

3.4. Research and Knowledge Utilization

Social studies education, especially in today's rapidly digitalizing world, focuses on developing students' abilities to access, evaluate, and apply knowledge (Shatrı, 2020). In this context, the integration of technology standards allows students to perform these processes more effectively and efficiently (Zhao, Llorente, & Gómez, 2021). The use of technology in information seeking, evaluation, and application processes enables students to gain an important skill set in both their academic and personal lives (Mohajan, 2020).

Searching for information is one of the most fundamental steps of education in the digital age. Students can access a wide range of information through the internet or digital databases. In this process, it is important to search for information using the right strategies (Shatrı, 2020). Using search engines effectively, accessing relevant and reliable sources with the right keywords constitute the basic steps of information seeking (Szymkowiak, Melović, Dabić, Jeganathan, & Kundi, 2021). In addition, students can also use resources that provide more targeted information, such as academic databases and digital libraries, allowing them to conduct in-depth research (Mohajan, 2020).

Evaluating the information obtained is the next step for students, and this is an important stage where critical thinking skills come into play. Students should evaluate the credibility of information by considering factors such as the source, author, date of publication and the platform on which it is presented (Mohajan, 2020). This prevents them from blindly accepting the information they encounter and enables them to develop a more informed perspective (Zhao, et al., 2021). Critical evaluation helps students analyze and compare information from different perspectives, which allows them to build a more comprehensive knowledge base. The process of applying knowledge offers students the opportunity to combine their theoretical knowledge with practice. Technology comes into play at this point with various tools, making it easier for students to integrate what they have learned into daily life and projects (Shatrı, 2020). By using technologies such as presentation software, graphic design programs or video content creation tools, students can express and share their knowledge more effectively (Mohajan, 2020). Such applications give students the ability to not only learn knowledge but also to transform and communicate it creatively (Szymkowiak, et al., 2021). The integration of the use of technology in the social studies course allows students to develop themselves in the processes of information seeking, evaluation and application. This ensures not only academic success, but also success in their future work life and social environment (Zhao, et al., 2021). Raising individuals who can use technology consciously is emerging as one of the goals of modern education and these competencies are among the indispensable components of social studies education (Shatrı, 2020).

3.5. Digital Citizenship

Social studies education does not only include the transfer of historical, geographical or cultural knowledge; it also focuses on how students can become conscious individuals in today's world. In this context, the awareness of being a correct, ethical and responsible digital citizen is becoming increasingly important in today's world where technology is rapidly developing and the digital world permeates every aspect of our lives (Peart, Cubo-Delgado, & Gutiérrez-Esteban, 2022). From a technology standards perspective, digital citizenship includes a set of skills and values about how individuals interact in the digital environment (Rivoltella, 2022). Giving students this awareness enables them to understand their rights and responsibilities in the digital world (Peart, Higgins, Gutiérrez-Esteban, & Cubo Delgado, 2024). The first step to becoming a proper digital citizen is to exhibit respectful and ethical behavior in online interactions. Students should learn how to communicate in a healthy and constructive way with other individuals in a virtual environment (Vlaanderen, Bevelander, & Kleemans, 2020). Ethical awareness covers how to use and share information encountered in digital environments. Students should learn to respect the copyrights of information and content and not to use others' materials without permission (Xu, Liu, & Ma, 2023). This will help them to make ethical decisions in the digital environment and to have core values such as respecting the labor of others. It is also important to raise students' awareness about recognizing and preventing the spread of misleading information in digital media (Peart, et al., 2022).

Another important element is security awareness. Securing information in the digital world, protecting personal information and taking precautions against online threats are integral parts of a responsible digital citizenship (Peart, et al., 2024). Students should learn to be mindful of the privacy of information they encounter through social media platforms, emails and other digital tools and adopt basic security measures such as using strong passwords (Rivoltella, 2022). As responsible digital citizens, students also need to understand the lasting effects of their digital footprint (Vlaanderen, et al., 2020). The awareness that every action in the online world can leave a lasting trace contributes to students developing a more careful and responsible behavior. This enables them to create a positive digital environment not only for themselves but also for their society (Xu, et al., 2023).

3.6. Communication and Cooperation

Social studies education aims not only to provide students with social and historical knowledge, but also to educate them as individuals who meet the requirements of the modern world. In this context, the ability to communicate and collaborate effectively through digital tools is among the important skills that students need to develop (Abdullaevna, 2024). With technology standards changing rapidly, these skills provide students with significant advantages in both their academic and personal lives (Widolaksono, & Rochmad, 2022).

As an active part of digital communication, being able to communicate effectively through different platforms and tools is of great importance for students (Карінцева, Євдокимов, Євдокимова, Харченко, & Дронь, 2020). Students should learn to communicate their messages clearly and concisely using different digital platforms such as email, social media, video conferencing applications and collaboration tools. In this process, communicating the message in a language and format appropriate to the target audience improves the quality of communication (Dadajanovna, 2024). Thanks to the flexible use of digital platforms, students can easily communicate and exchange views with their peers and teachers around the world (Abdullaevna, 2024).

The ability to work together is reinforced through group projects and collaborative learning experiences. Digital tools enable students to work together across geographical boundaries and in different environments (Dadajanovna, 2024). Cloud-based document sharing platforms, virtual discussion forums and collaborative project management tools facilitate student collaboration and enable more extensive knowledge sharing (Карінцева, et al., 2020). Such collaborative processes enhance students' teamwork skills, while also strengthening their problem-solving and decision-making abilities (Widolaksono, & Rochmad, 2022).

Moreover, working together with digital tools can increase students' intercultural awareness (Tynjälä, Virolainen, Heikkinen, & Virtanen, 2020). Collaborating with individuals from different geographical regions teaches students to respect other cultures and opinions. This diversity broadens students' perspectives and provides a more inclusive learning experience (Abdullaevna, 2024).

These standards are mostly shaped by organizations such as the International Society for Technology in Education (ISTE) and are updated over time in parallel with the development of educational technology (Карінцева, et al., 2020). By integrating such standards into their curricula, educational institutions can help students and teachers become more effective in the digital world (Widolaksono, & Rochmad, 2022; Tynjälä, et al., 2020).

4. Conclusion

According to the results, technology integration is not only a technology-oriented approach to education, but also aims to increase student achievement in line with pedagogical strategies (Davies, & West, 2014; Mills & Tincher, 2003). This process requires constant evaluation and innovation because technology is changing rapidly and educational needs are evolving accordingly (Harrell & Bynum, 2018; Zhao, 2007; Schoepp, 2005). By adapting to this constant change, educators can provide students with the most effective learning experiences. Digital tools and resources, when properly recognized and utilized in the educational process, can make learning more personal, flexible and effective (Akram, et al., 2022; Williams, et al., 2023). This process strengthens teachers' pedagogical skills and enables students to have engaging and meaningful learning experiences (Schmitz, et al., 2023; Tondeur, et al., 2021).Given the continuous evolution of

educational technology, it is vital for teachers to develop this capability in order to be prepared for future educational scenarios. Digital citizenship education enables students to grow as individuals who care about both their own online safety and the digital well-being of their communities (Öztürk, 2021; Pangrazio & Sefton-Green, 2021; Milenkova & Lendzhova, 2021). In this way, it contributes to making digital communities safer, supportive and responsible (Al-Abdullatif & Gameil, 2020; Fernández-Prados, et al., 2021).

The skills to communicate and collaborate through digital platforms are essential elements of modern business and education (El-Sabagh, 2021; Alamri, et al., 2020). These skills enable individuals and teams to work more creatively, efficiently and flexibly. They also contribute to providing ample opportunities to interact in a global context and expand professional and personal networks (El-Sabagh, 2021; Bernacki, et al., 2021). Meeting students' individual learning needs using technology increases their self-confidence and strengthens their motivation to learn (Sancar, et al., 2021; Alwaely, et al., 2023). This creates a more successful and satisfying educational experience. These customized learning opportunities offered by technology help educators maximize students' potential and support each individual's unique learning journey (Karalis & Raikou, 2020; Thornhill-Miller, et al., 2023). Acquiring skills such as computer use, internet research, and basic use of digital tools within the scope of social studies education contributes to the development of students as more knowledgeable, equipped, and responsible individuals in the digital age (Kayoe, & Godwin, 2023). These skills will have positive effects on both their academic and personal development in the long term and will enable them to become more informed participants in society (Korkmaz, et al., 2021; Khamchai, et al., 2022; Sailer, et al., 2021). Creativity and innovation in the context of social studies education enable students not only to understand the past but also to play an active role in shaping the future (Sawu, et al., 2023; Lee, et al., 2020; Newman, et al., 2020). These skills help them contribute to both local and global communities as socially conscious, entrepreneurial and proactive individuals (Anisimova, 2020; Mudra, 2020).

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Chapter 2 – Models to Technology Integration

Mustafa KOÇ

Chapter Highlights

- Three popular technology integration models, TPACK, SAMR and LoTi, were introduced in detail with reference to social studies education.
- Their philosophical and pedagogical underpinnings as well as strengths and challenges were discussed as identified in the literature.
- Research studies conducted in the last ten years on these models within the context of social studies education were reviewed.
- The review revealed the potential of these models germane to social studies education.

1. Introduction

As technology has been rapidly progressing and spreading to all areas of human life over the last three decades, numerous models, which can also be referred as frameworks or theories, have been developed to explain how it can be effectively implemented into educational settings. Their general rationale is to inform and guide both researchers and practitioners in terms of technology integration into teaching and learning. Prior research shows that teachers or student teachers appreciate the importance of connecting technology implementation to a theory that is clear, practical, and germane to learning outcomes (e.g., Kimmons & Hall, 2018). Particularly, these models have been utilized to evaluate the level of teachers' and students' technology usage, to investigate the potential consequences of technology on teaching and learning behavior of teachers, students and school managers, and to study factors, as either enablers or barriers, impacting successful technology integration in the schools. In addition to their contributions to technology practice, they have been facilitating to increase both breadth and depth of research studies and thus scientific knowledge especially in the field of educational technology.

Although technology integration models have similar purpose and common points, they might differ according to their focused concepts, assumptions or perspectives. While some focus on teacher characteristics and roles central to technology adoption in the classroom and teacher education institutions, others emphasize the range of technology-supported student activities in learning and teaching processes. In general, they conceptualize the integration process through various contextual factors including but not limited to school, teacher, technical and socio-cultural ones. Some scholars categorize these factors into two groups: teacher-level or individual/internal factors (e.g., age, years of experience, beliefs, attitudes, intention, competencies, and innovativeness) and school-level or environmental/external factors (e.g., organizational support, leadership, technological equipments, technical support, social and cultural impacts, and school culture) (Gurfidan & Koc, 2016; Inan & Lowther, 2010; Mazman & Usluel, 2011). None of the models dominates or prevails over the others because one model may not address the broad context of technology adoption and learning environments. While the existence of a plurality of models infers that no single model might be universally useful and valuable for a wide diversity of stakeholders including policymakers, teachers, students, and researchers, it also produces some difficulties to be dealt with in order for the field of educational technology to be progressed (Kimmons & Hall, 2018). Due to the diverse range of issues and perspectives addressed in the models, selecting a suitable model for technology use within a given educational context is usually confusing and overwhelming (Sackstein, Matthee & Weilbach, 2023). Therefore, educators are supposed to gain adequate conceptual understanding of what it means to integrate technology in education and how it can be successfully achieved.

In this review chapter, I introduce several prominent technology integration models that might assist social studies teachers, teacher candidates or academics to better understand the complexity of technology integration and guide them to enhance their teaching with available technology. They may also help researchers in the field of social studies education to conduct theory-based and structured empirical studies. My selection of models outlined here is based on their recognition and popularity among educational researchers and studies and includes Technological Pedagogical Content Knowledge (TPACK), Substitution, Augmentation, Modification, and Redefinition (SAMR), and Levels of Teaching Innovation (LoTi). My purpose in this chapter is not to provide the reader with a holistic view of these models but rather offer an overview of each model with their theoretical or philosophical underpinnings and research bases, pedagogical implications for educational practices, summary of critical evaluation provided in the literature as well as brief review of related research studies conducted the last decade within the context of social studies education.

2. Technological Pedagogical Content Knowledge (TPACK)

TPACK was originally developed by Matthew Koehler and Punya Mishra in the early 2000s inspired by the work of Pedagogical Content Knowledge (PCK) proposed by Lee Schulman in the 1980s. In his PCK framework, Shulman (1986) emphasized that knowing pedagogical knowledge and content area knowledge separately was not an adequate approach for teachers to teach effectively in their teaching subjects and that they needed to be competent in the intersection of both knowledge domains. In other words, he argued that teacher education programs should combine pedagogy and subject rather than treating them as mutually exclusive areas of knowledge. He defined the overlapping area of pedagogical knowledge and content knowledge as the pedagogical content knowledge (i.e., pedagogical methods and techniques particular to or appropriate for their teaching subjects). In a similar vein, including technological knowledge into the PCK framework, Koehler and Mishra (2008) proposed that pedagogical, technological and content knowledge should be brought together for technology use within education to be successful. In fact, they based this proposal on their own teaching experiences as they found that utilizing such a framework lead to effective technology integration. They used PTCK acronym or short-hand title at the beginning for their model but after several revisions and for easy pronunciation represented it as TPACK, standing for "Technological Pedagogical Content Knowledge". Some publication in the relevant literature used TPCK acronym as well. TPACK defines "teachers' knowledge of how to integrate content knowledge with appropriate pedagogical approaches, including those that use emerging technologies, to enable learners to master the subject matter at hand" (Brantley-Dias & Ertmer, 2013, p. 106).

Koehler and Mishra (2008) represented TPACK model as a three-circle Venn diagram in order to signify the interconnections between knowledge domains required for teachers' technology implementations (Figure 1). Therefore, the overlapping three circles produces seven knowledge types that teachers need to have for effective technology use: technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), pedagogical content knowledge (PCK), and technological pedagogical content knowledge (TPACK). The model infers that teachers' expertise in three different fields, TK, PK and CK, alone is not sufficient for effective use of technology. In addition to those main fields, they are ought to have proficiency in the dynamic and transitional interactions and relationships, both theoretical and practical, between and among them, called as TPK, TCK, PCK, and TPACK. As can be seen, such an approach is built on the thought that teaching with technology is a complex and ill-structured task.

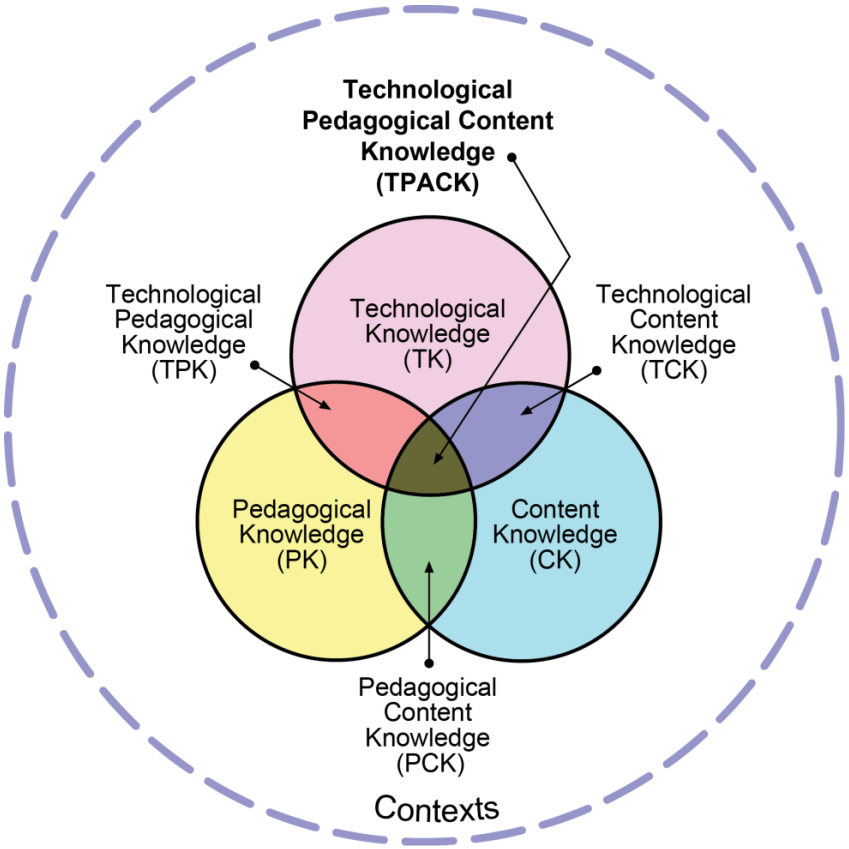

Figure 1. TPACK model (Reproduced by permission of the publisher, © 2012 by tpack.org)

TK refers to the knowledge of both traditional or analog tools (e.g., pencil, blackboard, microscope) and modern or digital ones (e.g., computer, smartboard, 3D printer). It also involves software, environments and recourses with regards to these technical equipments. Teachers are expected to

have critical understanding of them, recognizing both their affordances and constraints for teaching and learning, and apply them to accomplish a variety of different tasks such as information presentation and processing, problem solving, simulating or modeling, collaboration, communication and so on. Koehler and Mishra (2009) state that TK is not fixed or static domain and may constantly change over the years depending on the developments in technology. It is well known that technology is ever-changing, not always predictable, and its design and usage may come out in a range of forms (Hamilton, Rosenberg & Akcaoglu, 2016). Both the trends and applications of technology cannot always be predictable. This, of course, puts pressure on teachers to constantly renew or adapt themselves germane to changes in technology, underlining the importance of both the training of pre-service teachers and the professional development of in-service teachers. PK involves the knowledge of design and implementation processes of teaching and learning including diagnosing learners' characteristics and needs, defining learning goals, teaching methods, content delivery techniques, classroom management, measurement and evaluation (Kereluik, Mishra & Koehler, 2011). Pedagogically literate teachers know how students construct new knowledge and acquire new skills regardless of their CK. For example, micro teaching, case-based learning, cognitive development, feedback-correction, individual learner differences, self-assessment, portfolio development, educational counseling fall into PK. As the last main domain of the model, CK includes the knowledge about the subject matter or discipline that is to be learned and taught (e.g., fifth grade social studies, ninth grade geography). Beyond knowing the formulas, concepts, definitions and theories they will teach, teachers should have more detailed knowledge and be able to understand and explain the differences and relationships between the subject taught and other subjects (Pamuk, Ülken & Dilek, 2012). CK involves the knowledge and the nature of inquiry, and these differ between the disciplines. In the case of a secondary school social studies courses, for instance, CK would include concepts, facts and practices related to individual and society, culture and heritage, places and environment, production, distribution and consumption, citizenship, human rights, and globalization.

TPK is about the knowledge of how a range of technological tools can be used in particular way in teaching and learning and what consequence their usage might have for teachers and students. It is the ability of teachers' use of various technologies to create and implement innovative pedagogical strategies in their classrooms (Kereluik, Mishra & Koehler, 2011). Most of the technologies have been produced for communication, entertainment, and business functions, not directly for schools and educational purpose. This is where TPK is needed by teachers to look beyond common purpose of their use and explore the ways of leveraging them for pedagogical contexts and purposes. As Koehler and Mishra (2009) conclude, "the TPK requires a forward-looking, creative, and open-

minded seeking of technology use, not for its own sake but for the sake of advancing student learning and understanding" (p. 66). TCK refers to the knowledge about which technological tools are appropriate to teach specific subject or outcome and what kind of advantages and disadvantages they offer in teaching (Kaleli Yılmaz, 2015). Technology facilitates diverse methods for content delivery, concretizing abstract constructs through visualization, practice of theoretical concepts, safe and repeatable experimentation, presentation of information in multimedia environments (i.e., use of text, image, sound, and video) and these are all part of the TCK domain. As explained in Schulman's framework above, PCK contains knowledge that includes pedagogical methods suitable for learning or teaching a specific subject effectively and efficiently. It requires teachers to select the appropriate pedagogical methods and design instruction in accordance with the structure of the CK. Finally, TPACK is the interaction of TK, PK and CK and involves the sophisticated knowledge of selecting and using compatible and effective teaching and learning methods and technological tools for a given subject matter. It regards the utilization of suitable technology for effective teaching of specific content.

Rejecting a uniform approach to technology integration and standalone technology teaching in the schools, TPACK advocates the opportunities as well as the limitations that technology provides with various pedagogical methods and curriculums. This implies that numerous types of teaching context can be developed for specific content knowledge. In other words, different technology-enhanced instructional materials provide teachers with varying support for teaching specific subjects. TPACK aims for teachers to design learning scenarios in which students can better learn content or subject area knowledge with appropriate pedagogical styles and useful technological tools or environments. Such a purpose can be fulfilled by teachers through having the necessary knowledge and skills in not only content area but also pedagogical and technological areas. In this way, they can understand which technology produces best results, longest sustainability, and minimum problems with using which pedagogical styles on which subjects, that is, the combination of technology, pedagogy and content. The model implies that there is no only one or best way for quality of technology integration but rather alternative ways for the teaching of different subjects in different classroom contexts. Using a hermeneutic approach, Sackstein et al. (2023) reviewed 19 different theories and models commonly used to study technology acceptance, adoption or use in terms of four criteria: aim, strategy, paradigm, and view of technology. They categorized TPACK within the social theories which fit with researchers who aim to investigate social aspects of technology in education with a focus on human behavior, pursue a descriptive research strategy, embrace interpretivist paradigm, and view technology as an enabler of learning and teaching.

As explained above, TPACK focuses on the three bases of teacher knowledge and their interactions needed to accomplish productive technology use in education. However, having the knowledge of something (i.e., knowing that) does not guarantee an actual application of it (i.e., knowing how) because there may be other factors influencing its usage. Brantley-Dias and Ertmer (2013) criticize TPACK's ambiguous or general construct and highlight its lack of "distinction between having an abstract understanding of something and being able to apply that understanding in practice" (p. 115). They state that for teachers to teach effectively with technology in the schools there are other attributes such as pedagogical beliefs, teacher confidence, school policies, visions, and classroom cultures that need to be considered. Therefore, the most criticized or disadvantageous aspect of TPACK framework is its ignorance of other factors that play a significant role in the process of technology integration. Another critique of the TPACK is that it will eventually become transformed into the PCK as technology use in classroom becomes ubiquitous (e.g., Cox & Graham, 2009). This view recognizes it as a temporary model and expects it to lose its consideration over time. One another discussion about the model is the complexity and thus the difficulty of measuring all the seven type of knowledge domains encompassing TPACK due to their combined nature as well as the varying possibilities of content-specific uses of technologies and pedagogies (Archambault & Barnett, 2010; Brantley-Dias & Ertmer, 2013). Similarly, Kimmons, Graham and West (2020) determined six criteria as clarity, compatibility, fruitfulness, technology role, scope, and student focus for evaluating technology integration modes within the education of student teachers and accordingly summarized primary limitations or difficulties inherit to some models. They concluded that TPACK had fuzzy boundaries and hidden complexities (clarity), did not provide explicit guidance to teachers' classroom practices such as lesson planning (compatibility), had some domains whose distinctions might not be empirically confirmable like PCK versus TPACK (fruitfulness) and may be too comprehensive for teachers' context (scope). There are also some scholars that consider TPACK as more of a construct for designing and assessing professional development programs to increase teachers' technology integration capability rather than a technology integration model (e.g., Green, 2014).

The utilization of TPACK has been researched in several subject areas including social studies. Regarding research conducted in the last ten years, a number of studies focused on the issue of professional development of social studies teachers or teacher candidates. For example, Miguel-Revilla, Martinez-Ferreira and Sanchez-Agusti (2020) conducted one-group pretest-posttest quasi-experimental research to explore the effectiveness of a formative intervention based on the principles of TPACK model on digital competence of social studies pre-service teachers in Spain. To complement the TAPCK model, the intervention was guided by European DigCompEdu framework

to involve the utilization of digital resources to empower teaching and learning and implemented during the three months of a course teaching about innovation in history, geography, and art history. The results showed significant progress in all seven components of the TPACK, suggesting that TPACK offers a useful guidance for designing teacher education programs to improve digital competence. In a similar experimental inquiry, Beriswill et al. (2016) investigated the effect of four weeks of training focusing on subject-area content, effective pedagogies, and successful ways of integrating the latest classroom technologies on a group of social studies and foreign language in-service teachers in the USA. Their results revealed positive teacher satisfaction about the training as well as significant enhancement in teachers' confidence to teach 21st century skills and actual knowledge in all TPACK domains. Torun (2020) used a mixed-method approach to determine the impact of textbook preparation intervention on the TPACK self-confidence levels of juniors attending social studies teacher education program in a public university in Türkiye. The participants were first taught about ten instructional technology tools including word-cloud tools, concept mapping tools, Canva, QR codes, and augmented reality and subsequently asked to design a social studies textbook using these tools. The analysis of data from different sources including scale, metaphor form and self-assessment form showed positive changes on the participants' TPACK self-confidence. Another similar study found that practice-based digital material preparation training increased pre-service social studies teachers' TPACK self-confidence levels and resulted in positive changes in their fear of failure and learned helplessness (Kayaalp et al., 2022). A case study of three social studies teachers concluded that participation in a TPACK focused professional development resulted in improved technology self-efficacy and increased capability to overwhelm the obstacles related to effective use of technology to teach social studies (Knapp, 2017). Hong and Stonier (2015) reported about a geographic information system (GIS) teacher training including a seven-day summer workshop and three follow-up sessions given to social studies teachers in the USA. The training was organized and structured around the TPACK framework, technology (GIS), pedagogy (inquiry-based learning) and content (social studies). Participating teachers gave positive feedback about the usefulness and effectiveness of TPACK-based GIS training. From the perspective of student outcomes, Binjha et al. (2023) showed that providing pre-service social studies teachers in India with TPACK-based teaching practice program and then having them to carry out teaching practice in real classrooms resulted in significant increase in student achievement compared to traditional teaching practice approach. Likewise, Shokah and Al-Shammari (2023) found thatparticipation in a training program based on the TPACK model by social studies teachers engendered positive impact on their student achievement and the development of imaginative thinking.

Some studies were germane to explore TPACK levels of pre-service or in-service social studies teachers and their associations with demographic and contextual variables. Acikgoz and Akman (2023) examined epistemological beliefs and TPACK levels of primary school teachers and social studies teachers working in three different districts of Türkiye. Collecting data through an online questionnaire, they found that participants had a high level of TPACK knowledge and belief in the sub-dimension of effort. Regarding findings related to social studies teachers, TPACK scores did not significantly differ across gender and professional seniority but some scores significantly differed in terms of age (CK domain) and education level (PK and TPACK domain) in favor of young teachers and those with a master's degree. There was no significant relationship between social studies teacher' epistemological beliefs and TPACK levels. On a sample of pre-service social studies teachers, Aksin (2023) found that males had more knowledge in TC, CK, PK, and PCK domains than females; freshmen and sophomores had more knowledge in TK domain than juniors and freshmen had more knowledge in TPK domain than juniors and seniors; nonselective high school graduates had more knowledge in TK, TPK, TCK, and TPACK domains than selective high school graduates; those with home computer had more knowledge in TK domain than those without it; those with high or moderate level of computing skills had more knowledge in all TPACK domains than those with low level of computing skills; were higher than those with low technical computer skills; and those spending 11 or more hours on computing per week had more knowledge in TK domain than those spending less time. Bentil (2024) surveyed senior high school social studies teachers in Ghana in terms of their competency in the use of ICT and TPACK knowledge. His findings revealed that teachers' ICT and TPACK competencies were in a high level and both were significant predictors of classroom instructional practices. In another study conducted in Ghana, it was shown that geography teachers working at senior high schools possessed high level of CK and PK but lower level of TK (Mensah, Poku & Quashigah, 2021). Umbase (2023) revealed that Indonesian social studies teachers' knowledge and skills of learning management, which was structured in three components as planning, implementing, and reflecting using TPACK, were moderate or tended to be low, suggesting professional development for identifying learning needs of students and accordingly design, implement, and assess TPACK-based instruction.

Another group of studies described how social studies teachers applied TPACK in their classrooms. For instance, Van Vaerenewyck, Shinas and Steckel (2017) conducted a case study to describe one social studies teacher's sociocultural-orientated TPACK in a secondary school history lesson in the USA. The teacher was selected as an exemplar of high competency in technology-integrated content and content literacy instruction. Based on classroom observations and semi-structured interviews, the researchers concluded that grounding TPACK in the tenets of sociocultural learning theories,

which they called as expanding TAPCK to TPACK+, was a valuable way of providing students with socially situated learning experiences in which they could engage in authentic opportunities both within and beyond the classroom to develop content-specific literacies. In a similar case study in the USA, Gomez (2015) selected a eighth-grade social studies teacher due to his experience with teaching with technology, 13 years of classroom experience, bachelor's and master's degrees in history to explore what TPACK looks like in classroom practice. Based on the observation of this teacher's classes, collection of his artifacts, and interviews with him, the study demonstrated that he mainly concerned with meaningful learning rather than memorizing, active thinking, historical reasoning, view of technology as a tool for instruction at his disposal, selection of technology based on its affordance to student learning, and in short, shaping technology to his needs as a teacher and not allowing technology to shape him. Using a multiple case study methodology, Gomez (2016) examined how three social studies teacher combined technological, pedagogical and content knowledge when making decisions about their curriculum. Teachers were selected from each grade of a middle school, where technology integration was committed and school wide one-to-one laptop initiative was implemented. Analyzing the data from multiple sources, he found that TPACK was developed uniquely in each teacher, shaped by their beliefs and strengths in teaching, and it was influenced by factors related to students and teaching environment. He suggested rethinking of the TPACK as it failed to account for participating teachers' TPACK practices and to differentiate between depth and breadth of TPACK knowledge. Hilton (2016) collected two veteran teachers' reflection on yearlong iPad integration into eight grade social studies classrooms in an ethnically and socioeconomically diverse school district in the USA. Through the lenses of TPACK model, teachers felt that it was not fully reflective of their actual classroom practices, suggesting a disconnection between the realities of technology use in the classroom and the model. They stated that it was most useful for wedding instructional technology to instructional activities with strong pedagogical and content foundation.

In several studies, TPACK framework was employed to design a technology-enhanced instruction and to observe the consequences of its implementation on students' cognitive and affective behaviors. Darmawati, Busyra and Azhar (2024) explored whether using TPACK approach could improve fifth grade students' social studies course outcomes at a private school in East Jakarta, Indonesia. They carried out three-cycle classroom action research and observed the outcomes using a test administrated as pre-test and post-test in each cycle. The action plan included making and implementing lesson plans with learning strategies and active learning scenarios based on the TPACK model. This plan was redesigned based on the reflection after each cycle. The results indicated that 60% of the students fulfilled minimum completeness criteria for learning outcomes in

the first cycle, which increased to 70% in the second and 82% in the third cycle. Likewise, Priandini, Supriatna and Anggraini (2023) conducted a three-cycle classroom action research to explore the consequences of TPACK-based social lessons on Indonesian junior high school students' creativity. They made use of TPACK by choosing social studies as content, Capcut, a free easy to use mobile application for video editing, as technology and project-based learning as pedagogy. Each cycle corrected the deficiencies occurred in the previous cycle and required students to produce video clips about the topic covered. The observation data about students' creativity performances and an assessment of their videos indicated increases in students' creativity in each cycle, from 50% to 75% in the second cycle, and from 75% to 95% in the third cycle. There were also studies demonstrating positive impacts of implementing TPACK-based Numbered Head Together (NHT) learning model on critical thinking and student motivation in history learning (Ula, Darsono & Sariyana, 2024), TPACK-based History Learning Media on history leaning outcomes (Kurniawan & Sumargono, 2021), TPACK-based learning on students' understanding and performance in natural and social sciences (Nahdliyin & Mahmudah, 2023), project-based learning with TPACK approach on student learning outcomes in history classes (Sitanggang, Diansyah & Gultom, 2024).

3. Substitution, Augmentation, Modification, and Redefinition (SAMR)

The SAMR model stands for Substitution, Augmentation, Modification, and Redefinition and was introduced by Ruben Puentedura in 2006 as a part of his work with the Maine Learning Technologies Initiative. This initiative was a governmental program and deployed all of middle and high public school students (from seventh grade to twelfth grade) and teachers in the state of Maine, USA with a personal learning devices such as tablets, netbooks, laptops and related software depending on the technological advancements in order for them to become prepared for a rapidly changing world (Maine Department of Education, n.d.). The SAMR was originally intended to encourage teachers in the state of Maine to improve the quality of education through the use of technology. The focal point of it is to conceptualize technology integration at different levels using a four-level taxonomy-based approach, that is, different ways of selecting, using and evaluating learning technologies within their teaching contexts. The model focuses on the functionality of educational technologies, and in so doing, provides teachers with practical advices or specific strategies to inform their instruction (Cherner & Mitchell, 2021).

Puentedura (2013) defined four classifications or levels of technology integration in the SAMR model (Figure 2). The first level, the bottom level of technology usage, is called as "Substitution" and identifies technology use to replace already existing teaching and learning activities without any functional change. For example, social studies teachers can share a digital map with students instead

of a traditional map drawn on a paper. Both maps here are used for demonstration purposes and one has no advantage over the other for this purpose. The second level is "Augmentation" which also classifies technology as a substitute for prior activities but this time with some type of functional improvements on either or both of the tasks and tools. Turning back to the example in the case of social studies subject given above, the digital map can enable students to select any two places in the map and ask the map to calculate the distance between them or hover the mouse over the cities to see descriptive information about them in pop-up boxes using audio or video, which are not possible on a paper-based map. In this case, the digital map augments map reading task. Therefore, the use of digital map in the latter offers some advantages or improvements over the use of a paper-based map. As can be seen, both Substitution and Augmentation levels classify technology use as an enhancement to teachers' instructional practices and students' learning. They represent how technology integration can replicate analog resources that have been traditionally utilized in a way that is more efficient and productive (Cherner & Mitchell, 2021).

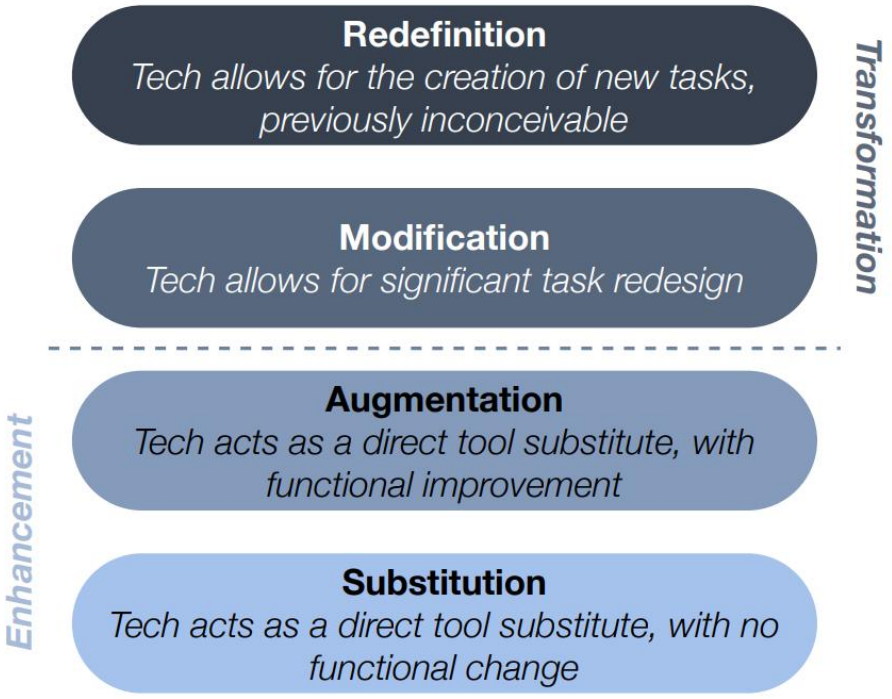

Figure 2. SAMR model (Puentedura, 2013)

Being as the third level, "Modification" refers to technology use that requires or allows for redesign of learning activities (Puentedura, 2013). For instance, social studies teachers can use an earthquake simulator and ask students to explore different magnitudes and their possible consequences. This

simulator could even be a 3D environment enhanced with mixed reality technology containing both real and virtual objects, where students can experience past earthquakes and practice what to do (i.e., necessary emergency procedures) during and after an earthquake. The last level, the top level of technology usage, is "Redefinition" which allows for the creation of novel learning tasks that would otherwise be impossible or unaffordable (Puentedura, 2013). Social studies teachers may have their students create a short documentary film using their camcorders or mobile phones on a topic like production and consumption instead of write an essay about it. Using new communication technologies, they can extend their classrooms and learning environments to the real world (Oded & Oded, 2022). In this way, students in social studies course or foreign language courses can not only observe other cultures but also interact with their members. As another example for social studies or geography courses, students may be asked to calculate the coordinates of a specific location, or vice a verse, find the location given its coordinates using cell phones and GPS technologies. This type of technology use exemplified for the Modification and Redefinition levels offers interactivity, participation, personalization, contextualization, or situated learning scenarios which directly affect and transform the way of students' learning and teachers' instructions. These upper levels represent how technology integration can create novel learning experiences that cannot be possible using resources that have been traditionally utilized (Cherner & Mitchell, 2021).

As elaborated above, each of the four levels of SAMR demonstrates a unique way of teachers' understanding and us of technology to support pedagogical goals. While the model has been most often represented as a hierarchy, it can actually be viewed as a heterarchy based on the teaching contexts (Thompson, 2022). From a hierarchical perspective, teachers are expected to ultimately reach to the upper levels to obtain the full potential of technology. However, this may not be sometimes necessary, if not possible, because the lower levels might be enough, or perhaps the only option, for the given teaching and learning contexts to produce desired results. There could be some restrictions or obstacles arising from technical infrastructure, curriculum design, teacher characteristics, school cultures or management styles that may not be worth for a particular level. Consequently, teachers are not necessary expected to reach up to the top levels and continue to teach at that level forever. They are rather expected to explore appropriate levels for their varying structures of subject matters. In a hermeneutic review of models in terms of their aim, strategy, paradigm, and view of technology, Sackstein et al. (2023) sorted out SAMR within the education and technology theories which fit with researchers who aim to prescribe varying levels of technology use to support learning and teaching, follow a normative research strategy, operate from the positivistic paradigm, and have a technocentric view of technology.

Although the SAM model has a rising popularity due its simple adaption and easy interpretation, it is also subject to some criticism. The most argued deficiency is that its theoretical explanations or explorations is not adequately developed and discussed in the peer-reviewed literature as Puentedura's related works are mostly presentation files shared on his weblog and they have limited connections to prior studies, which calls for further theoretical and empirical evidence (Green, 2014; Hamilton et al., 2016). Hamilton et al. (2016) highlight three challenges associated with the model. The first focuses on the absence of contextual factors including technological resources available in the classrooms, students learning needs and styles, teacher knowledge, and support services. The second centers on the emphasis placed on product over process. They think that the SAMR simplifies the use of technology in a manner that alters an instructional activity and thus deemphasizes the important processes inherent to learning. The third one is about the rigid structure of the model. The taxonomical or hierarchical approach within the SAMR is challenged to predefine teachers' technology uses to be belonged to only four specific practices. They believe that this shifts the emphasis on teachers' practice from changing pedagogy and instructional practices to reaching prescribed technology usage levels. In other words, its prescriptive nature and technocentric focus were limiting in spite of its structured way of technology integration. In their content analysis of educational technology frameworks using critical media analysis lens, Cherner and Mitchell (2021) failed to locate any studies showing SAMR's improvements in learning outcomes in their review of literature and stated that it was mostly applied as an evaluation tool for teachers' use of educational technologies. Within the context of guiding technology integration for pre-service teachers, Kimmons et al. (2020) indicated unclearness of the boundaries between the levels such as Substitution versus Augmentation (clarity), the possibility of the level distinctions being not meaningful to teachers (fruitfulness), and implied student activities being not explicit or inherent in each definition of each level (student focus) as the main limitations of the SAMR model.

Prior research in the last decade about the SAMR model in social studies related subjects focused mostly on the utilization of this model to reflect and/or assess the implementation of technology in education. Crompton and Burke (2020) conducted a systematic literature review to examine research took place between 2014 and 2019 about the use of mobile devices from in PreK-12 education. They employed SAMR model to codify the level of SAMR model representing students' engagement in mobile learning activities applied in the studies. Of the studies they examined, nine of them (5%), one of the lowest rates among the all subjects, were identified within the social studies subject and their distribution according to SAMR levels was as follows: augmentation (44%), redefinition (33%), modification (22%) and substitution (0%). They stated that social studies as a subject matter can facilitate to connect students with people and events around the world and thus called for more

research on mobile technology use in its instruction. In a study of social studies teachers' ways of technology integration and perceptions of barriers or facilitators in this regard (Delgado, 2019), participating teachers in the USA reported that their level of technology implementation into their classrooms varied with respect to characteristics of students and classroom environment including crowded classrooms, lower or higher achieving students (i.e., atypical learners), and increased need for behavior management. According to SAMR levels, their lower level integration typically included PowerPoints or a Smart Board for delivering content and assignments whereas high level comprised of coding apps, virtual tours and collaborative research assignments. Research by Hilton (2016) also found that using technology for acquisition of content was reflected by participating social studies teachers as a representative of substitution and augmentation levels whereas using technology to practice social studies skills was represented in the modification or redefinition levels. The findings acknowledged the usefulness of model for revealing teachers' capability to use technology for teaching goal accomplishment rather than instructional design to reach a particular SAMR level. Complementary case studies by Violanti (2023) explored the characteristics of professional teacher development programs for technology integration into social studies teaching in a high achieving suburban school district in Western New York and found that the offerings were rich in substitution and augmentation but poor in modification and redefinition levels of the SAMR model. Cherner and Curry (2017) conducted a case study of pre-service teachers' use of instructional technology during their teaching internship. According to their findings, pre-service social studies teachers most commonly used technology within the levels of substitution (e.g., CNN Student News, PowerPoint), augmentation (e.g., Google Drive, EdPuzzle, Quizzes, Popplet, Kahoot) and modification (e.g., Google Drive, iCivics, StoryBoardThat, Poster My Wall), and. least commonly used technology within the level of redefinition (e.g., recording an original song, creating music video).

Some studies employed the SAMR model as a foundation to design, implement and evaluate professional development programs. A descriptive case study carried out by Hanshaw (2021) examined how professional development sessions in educational technology and creation of lesson template affect technology integration in middle school social studies lessons. Professional development was guided by TAPCK and SAMR models. Participating teachers participated in asynchronous session and utilized the template to plan their instructions. The findings indicated that incorporation of SAMR model supported participants to analyze technology use from the perspectives of classroom practice. Carr (2021) created a professional development session for social studies teachers over HyperDoc and evaluated how this training aligned with the SAMR framework.

She demonstrated that HyperDoc training enabled teachers to move beyond the substitution level of technology use to transform student learning.

Another group of studies investigated the consequences of SAMR-based technology integration into social studies lessons on student outcomes. For example, Wilson (2021) conducted an action research to explore how varying levels of technology use in 9th and 10th grade social studies lessons have an effect on student motivation. Student were given 25 lessons, eight of which were dedicated to substitution, seven dedicated to augmentation, six dedicated to modification and four dedicated to redefinition level of SAMR, and after each lesson they were asked to indicate how it motivated them based on the levels of Attention, Relevance, Confidence, and Satisfaction (ARCS) model. The study revealed that student were more engaged and motivated in modification and redefinition levels than lower levels. In a mixed method action research conducted by Miller (2019) in the USA, video was integrated into 7th grade social studies classroom in accordance with three levels of SAMR model and the effects of this integration on students with diverse academic classification. At the augmentation level, students watched teacher-created video clips and responded related questions; at the modification level, they created their own videos; and at the redefinition level, they created animation videos, shared them via an online presentation, answered other students' questions and made comments on their videos. It was shown that students not classified gifted and talented enjoyed augmentation level of video integration more than students classified as gifted and talented. Moreover, all students, regardless of their academic classification, enjoyed modification and redefinition levels more than the augmentation level and the redefinition level was engaging after multiple lessons. In a recent case study conducted by O'Donnell-Chavis (2022), students were taught U.S. History with the enhancement of interactive website and then they were asked to create a final video project about a historical figure of their choice. Students' videos were assessed using SAMR-based rubric and the results were associated with students' historical thinking levels. The study concluded that the more students used historical thinking and research skills, the better and newer ways they employed technology.

4. Levels of Teaching Innovation (LoTi)

Aligning with the concepts of school change and innovation adoption, the LoTi model is a framework that examines educators' level of technology integration. It was first created by Christopher Moersch in 1994 with a standing name as "Levels of Technology Implementation" as an assistant for school districts in their staff development works (Moersch, 1995). The model was originally designed as a measurement of teacher behaviors related to technology implementation and thus it has been officially adopted as an instrument to gauge teachers' use of instructional technology and its impacts on students throughout the USA. About 15 years later, based on research and

experience, Moersch (2010) improved the initial model to account for the new digital tools, new ways of teaching and new standards emerged from the Partnership for 21st Century Skills as well as National Educational Technology Standards for Teachers (NETS-T) by International Society for Technology in Education (ISTE). The refreshed model continued to use the previous acronym (LoTi) but changed its name as "Level of Teaching Innovation". As Moersch (2010) described, "the newer model emphasizes powerful learning and teaching as well as the use of digital tools and resources in the classroom" (p. 20). The initial model inspired from both Apple Classrooms of Tomorrow (ACOT) and the Concerns-Based Adoption Model (CBAM). The newer one was expanded by the inclusion of Current Instructional Practices (CIP) and Personal Computer Use (PCU) frameworks. The CIP assesses instructional practices evolving from teacher-centered to learner-centered. The PCU gauges teachers' proficiency in using digital tools and resources for student learning. The higher the PCU level is, the more teachers are skilled in emerging digital tools and the more they advocate and commit their utilization in education. Moersch (2010) offered an accompanying framework, H.E.A.T, standing for Higher-order thinking, Engaged learning, Authentic learning, and Technology use. This framework can be used as a self-assessment tool to measure the implementation of its dimensions in the classroom.

Using a hierarchical approach to classify technology integration, both the initial and revised LoTi models have seven discrete and progressive levels beginning with Level 0 (Non-use) and ending with Level 6 (Refinement). Table 1 presents these levels with the enhancements added through the revision. Moersch (2010) describes these levels as follows. Level 0 (non-use) indicates that teachers' instructional practices do not implement technological tools. Conventional resources are in use throughout the school. Level 1 (awareness) signifies that teachers use technology to present or deliver course content to students, to manage curricular tasks or award students. Level 2 (exploration) is where students start using technology. Their usage involves information gathering, extension or enrichment activities that support the development of lower order thinking skills (e.g., knowledge, comprehension). Level 3 (infusion) is the indication of student use of technology for completing teacher-created tasks that reinforce the development of higher order thinking skills (e.g., application, synthesis, evaluation). The fourth level, integration, consists of two sub-levels, 4a and 4b. Level 4a is the mechanical integration of technology which enables students to solve authentic problems, resolve real world issues and explore their own queries. However, this integration is not full or complete due to the existence of some obstacles or barrier teachers may experience in the classroom or school. Level 4b is the same as Level 4a but here the integration reaches to its fullest level as teachers are in the comfort zone. Level 5 (expansion) extends learning and teaching activities beyond the school. Student can collaborate with students, educators or scientist from another school,

institution or culture through the use of digital platforms. Lastly, Level 6 (refinement) indicates that students use a variety of digital tools and resources pervasively and innovatively according to their learning needs and interests. As can be seen, the levels together forms a continuum which shifts type of learning from teacher-directed to student-directed, type of activity from practice-based to problem-based, the level of cognitive complexity from low to high, and the technology integration from occasional, ordinary and consumer-oriented usage to pervasive, innovative and production-oriented usage.

Table 1. Technology integration levels defined in LoTi model (Moersch, 1995, 2010)

LoTi level	**Main characteristic**	**Type of learning**	**Type of activity**	**Cognitive complexity**
0 Non-use	Absence or nonuse of digital tools and resources			
1 Awareness	Teacher use of technology to enhance lectures	Teacher-directed	Practice-based	Low-level
2 Exploration	Student use of technology for information gathering and extension activities	Teacher-directed	Practice-based	Low-level
3 Infusion	Student use of technology for conducting teacher-created tasks supporting higher order thinking	Teacher-directed	Practice-based	Low-level
4a Integration (mechanical)	Student use of technology for solving authentic problems and student-created questions but teachers dealing with barriers that restrict full integration	Learner-directed	Problem-based	High-level
4b Integration (routine)	Student use of technology for solving authentic problems and student-created questions and teachers are in comfort zone	Learner-directed	Problem-based	High-level
5 Expansion	Student use of technology to collaborate beyond the classroom	Learner-directed	Problem-based	High-level
6 Refinement	Student pervasive use of a variety of digital tools to regulate their own learning beyond the conventional methods	Learner-directed	Problem-based	High-level

Since its initial introduction and subsequent refinement, LoTi has been used in the research studies and established its validity and reliability. Despite its widespread use, it has been criticized in term of several issues as well. According to the six criteria proposed by Kimmons et al. (2020) to determine the quality of technology integration models within the context of teacher education, the LoTi model was found to have limitations in terms of compatibility (highlighting factors that are essential and practical for teachers' works) and fruitfulness (leading teachers to meaningful thinking and reflection) criteria. The model was criticized for laying overemphasis on student activism, having too many levels, unclear distinctions between the levels, and the possibility that teachers might not find the hierarchical structure valuable. Curry, Jackson and Morin (2022) stated that it was viewed to not show the flexibility or strength expected from learning models accordant with the changes due to technological advances over the last few years. Several scholars designed instruments through modifying LoTi model to reflect 21st century skills and practices. For instance, Manglicmot (2015) modified items from LoTi and Digital Age Survey (Moersch, 2010) to measure both teachers' and students' use of technology for critical thinking, problem solving, creation, collaboration, global communication, innovation, managerial tasks and productivity.

Most of the previous studies conducted in the last decade on LoTi framework within the context of social studies education, albeit few in number, focused on the determination of teachers' or candidates' level of technology integration using LoTi-based instruments. For example, Underwood (2022) conducted quantitative comparative study to compare social studies teachers working in rural and non-rural school in the USA in terms of their technology self-efficacy and technology integration. The instrument used to gauge the level and frequency of technology integration into instructional practices was the Level of Technology Integration Scale (LOTIS), adapted from the LoTi questionnaire by Manglicmot (2015). Although the study failed to indicate significant differences between rural and non-rural groups, the findings suggested that social studies teachers working in the rural schools had higher levels of technology self-efficacy but lower level of technology implementation to the extent of teachers working in non-rural schools. Walters (2017) carried out an action research based case study to explore to what extent social studies teachers working in a junior high school in the USA employed technology standards in their classrooms as well as determining factors that were obstructing or enabling the technology implementation in social studies courses in this school. She collected necessary data via the LoTi Digital Age Survey for Teachers, the Looking for Technology Integration (LoFTI) lesson observations tool and teachers interviews. The findings indicated that participating social studies teachers perceived that they had the capabilities and skills needed for effective technology integration; their students used technology for low-level activities such as word processing and basic internet searches; and leadership did not

support their efforts to use technology standards to assess student technology literacy. The data revealed themes as "lack of accountability, equity, access, need for student- centered practices (mental health support), school climate challenges and need for sustained professional development and support" (p. 92). Polly and Rock (2016) investigated elementary education teacher candidates' technology integration level in their instructional design of interdisciplinary units including science and social studies content in the southeastern USA. They operationalized level of technology use based on the LoTi framework. The data were gathered primarily from the lesson plans created by the candidates and analyzed inductively to cite each instance where technology was integrated. Data analyses showed that the inclusion of teacher-centered technology integration instances was higher than the inclusion of student-centered instances in the lesson plans. Of the instances of technology use, only about 7% were related to level 4 uses in conjunction with higher-order thinking and project activities. Regarding relationship between the level of technology use and content, social studies units had significantly more level 3 or 4 technology inclusions than science units. Inspiri ng from the challenge of LoTi and TPACK for history teachers to employ new tools, DeSantis et al. (2017) took place a quasi-experimental research study to compare high school students' learning outcomes from technology supported synchronous and asynchronous history lessons. Although both synchronous and asynchronous groups received the same content slides, questions and stimuli, the former participated in direct instruction via Nearpod and completed performance-based assessment at home whereas the latter watched question-embedded stream video using Playposit at home and completed performance-based assessment in class. Both methods improved students' historical thinking skills and content knowledge but synchronous group was more satisfied with the quality of the instruction than asynchronous group.

6. Conclusion

The issue of technology integration into education has been placed high on the political agenda of every country in the world. In fact, 21st century knowledge economy and the skills it requires individuals to have and effectively use have increased its importance and priority. It is now well-known that successful technology integration in education is not a straightforward process; on the contrary, it has a multi-dimensional, difficult and complex nature. Not only economical or budgetary factors but also organizational, cultural, and technical ones can hinder or foster instructional use of technology in the schools. For this reason, educational scholars and organizations have been developing various models or frameworks for better conceptualization, efficient application, easy management and accurate evaluation of technology use in teaching and learning. Their primary purpose is to provide both researchers and practitioners with robust theoretical bases as well as meaningful and sustainable ways of leveraging technology in education. They attempt to

explain successful technology implementation into education through determining its essential stages or components. This chapter introduced three frequently referenced models, TPACK, SAMR and LoTi, and reviewed the related research studies in the last ten years conducted within the context of social studies education. TPACK focuses on three knowledge domains and its interactions that teachers need to have for the achievement of pedagogically sound use of technology in their teaching. SAMR illustrates how teachers' instructional practices or students' learning activities without technology use can be enhanced and/or redefined with the utilization of technology. LoTi offers different levels of technology implementation on a continuum defining types of learning, types of activity, and levels of cognitive complexity. As discussed in detail in the preceding sections, each model has their own philosophical and pedagogical foundations and the related literature identifies their strengths and challenges. While research studies exist to explore each model within the literature of social studies education as summarized in this chapter, TPACK is mostly investigated, followed by SAMR and LoTi respectively. Although each model has the potential to support social studies curriculum and none of them can be a panacea for the complex process of technology use in education, this review reveals that TPACK can be preferred as a conceptual basis for designing social studies pre-service and in-service teacher education curriculums, SAMR can be used as a practical guide for social studies teachers to design technology-supported instructional activities, and LoTi can be utilized as a measuring tool to gauge the level of technology integration in social studies courses.

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Chapter 3 - Barriers to Technology Integration

Muhammet DEMİRBİLEK

Chapter Highlights

- Technology integration
- Social studies
- Barriers to integration
- Digital divide
- Strategies for overcoming challenges

1. Introduction

The integration of technology in education in the last 20 years has led to radical changes in both teachers' teaching methods and students' learning processes. With developing technology, digital textbooks, interactive boards, tools, and virtual reality and augmented reality applications have contributed to the personalization of learning environments and have also provided new opportunities by encouraging collaboration among learners and developing critical thinking skills. Educational technologies, which have gained a new dimension with artificial intelligence, offer the opportunity to create interactive and personalized teaching environments by going beyond traditional methods. Thus, students can actively participate in the learning process. Educational simulations, virtual reality applications, and online interactive tools in particular allow students to understand and learn abstract and complex concepts. However, despite all these opportunities provided by technology, it is a fact that there are various obstacles in terms of equal access and implementation of effective teaching processes.

Educational technologies in social sciences education are an important tool that enriches the learning experience and makes abstract concepts more concrete. For example, interactive maps, augmented and virtual reality applications, digital archives, and virtual field trips allow students to better understand concepts in the field of social studies. Educational technologies also provide students with different perspectives, broadening their perspective and understanding of global cultures and historical events (Kayaalp & Meral, 2023). When used correctly, educational technologies encourage critical thinking, support inquiry-based learning processes, and help students make connections between complex social science topics (Erdoğan, & Şerefli, 2021). The Interdisciplinary nature of social sciences, educational technologies play an important role in visualizing abstract concepts and helping students develop meaningful solutions to real-world problems.

Although educational technologies have positive contributions to the teaching and learning processes, it is not correct to see them as completely problem-free tools. There are also serious obstacles to the use of technology in social science education. These obstacles can be listed as limited access to educational technology tools, inadequate or non-existent internet connections, and teachers' lack of professional development (Pittman & Gaines, 2015). Social studies teachers may have difficulty aligning educational technologies with the curriculum and meeting the needs of students in a technology-supported environment. In addition, problems such as inadequate digital literacy skills, distractions in the classroom environment, and insufficient administrative support make the integration of technology into teaching processes even more difficult. In this book section, the obstacles that may be encountered in the integration of educational technologies into the classroom

environment will be discussed in detail, and suggestions will be presented on how to overcome these obstacles.

2. Infrastructure and Resource Limitations in Schools

The seamless integration of instructional technologies into Social Sciences classrooms offers significant opportunities to facilitate the teaching-learning processes for both teachers and students. However, infrastructure and resource constraints, especially in public schools, continue to create obstacles to the successful use and adoption of instructional technologies. In most existing schools, limited access to technological tools, inadequate funding, and internet connectivity prevent the full use of digital technologies for teaching and learning (Kaya & Koçak Usluel, 2011).

The use of educational technologies in Social Sciences courses has significant potential to enrich students' learning processes and make lessons more interactive and understandable. However, inadequate infrastructure and economic reasons in schools make it difficult to fully realize this potential. The lack of technologies such as computers, tablets, virtual reality headsets, projectors that will enable the use of educational technologies in schools, insufficient budget allocated to schools due to economic reasons, and problems with internet connections are the main problems that prevent the effective use of digital tools in teaching processes.

2.1. Limited Access to Technology

The digital divide refers to the gap between schools and students with access to technology and those without (van Dijk, 2005). While private schools in urban areas have better educational technologies, schools in rural areas that do not receive sufficient financial support generally have fewer opportunities (Warschauer, 2004). While schools in cities generally have more modern technologies, these opportunities are limited in schools in rural areas and low-income areas, so students studying in cities and rural areas do not have the same access to technology as students studying in rural areas (Warschauer, 2004). For example, while students whose families are economically well-off have computers and other digital devices individually, students whose families are economically poor do not always have access to technological devices. This inequality creates differences in students' access to 21st century skills (Kaya & Koçak Usluel, 2011).

2.2. Lack of Hardware and Internet

The lack of computers in school computer labs, and the fact that students have to share computers, limits individual learning opportunities. The lack of a local internet connection also makes online research, digital maps, and archives very difficult to use. This situation causes problems for teachers who want to use computers and the internet in their classes.

2.3. Economic Restrictions

The limited budgets allocated to schools due to economic reasons are a permanent obstacle to integrating technology into teaching processes. Despite all economic constraints, schools often face restrictions in updating or maintaining the teaching technologies they have over time. Public schools, in particular, have to prioritize basic needs rather than supporting technological developments due to limited budget allocations. For example, virtual tours and interactive software can make a big impact in education; however, the high costs of these tools are inaccessible to schools with limited funds. Even after the technology is acquired, regular maintenance, software updates and IT support strain budgets. Lack of technical staff and high costs can reduce the usability of existing devices.

2.4. Insufficient Internet Connection

Inadequate internet infrastructure, especially in rural areas, is a major obstacle to accessing online content. Slow internet connections can prevent timely access to digital resources. Access to multimedia content is vital in disciplines such as Social Sciences. However, inadequate internet connections make it difficult to use such content, leading teachers to resort to traditional methods. This prevents students from accessing interactive, rich content learning resources or causes them to miss out on opportunities such as exploring global perspectives.

Infrastructure and resource limitations are important obstacles that limit the potential of technology in education. In order to provide equal access to technology in schools, more budget should be allocated to schools, especially those in rural areas, internet infrastructure should be developed, and a professional development infrastructure should be created where teachers can receive technical support. Solving these problems will increase equal opportunities in education and ensure that students are trained in accordance with the requirements of the digital age.

3. Professional Development of Teachers

That the use of technology in social sciences education and the preparation of teachers for using technology professionally will make significant contributions to technology integration. Because, the effective integration of technology into social sciences courses largely depends on the level of preparation of teachers and their professional development processes (Hew, & Brush, 2007). Although today's educational technologies have the potential to develop and enrich learning environments, the realization of this potential depends on teachers developing their skills in using technology (Ertmer, 1999). In general, social sciences teachers cannot fully realize the professional development process due to both limited professional development opportunities and resistance to change. Professional development, especially in terms of technology integration, plays an important

role in ensuring that teachers use technology effectively from a pedagogical perspective. However, in many schools, technology-related training is usually limited to short-term studies that provide superficial information. For example, even if social sciences teachers are introduced to interactive mapping software or digital timetables, they may not have sufficient knowledge on how to integrate these technological tools into their lesson plans. This will prevent the pedagogical benefits of technology from being fully understood and used.

Professional development training should not be limited to the technical use of technological tools, but should also focus on how to integrate these tools to support the objectives of the relevant courses. For example, using Google Earth to teach a topic such as migration patterns requires not only knowledge of how to use Google Earth software but also training on how to create effective instructional designs that will enable the use of this tool during the course.

4. Cognitive and Pedagogical Barriers to Technology Integration

That social studies teachers face is how to integrate technology into their teaching and learning processes. Although technologies such as interactive maps, digital simulations, animations, and other online resources provide many opportunities for use in the classroom environment in social science teaching, teachers' ability to use these tools for specific learning objectives is often limited (Bal & Karademir, 2013). The main reasons for this can be expressed as teachers' adherence to traditional approaches and resistance to change (Çakır, 2013).

Teachers who have been accustomed to teaching based on textbooks, traditional lectures, and paper -based assignments for many years may be reluctant to adopt digital tools out of concern that they will make teaching more difficult. For example, teachers may not want to use digital simulations or computer games in a lesson on historical events because they believe that this could disrupt the integrity of the lesson.

Teachers who are referred to as digital immigrants, in other words, teachers who grew up in a time when computers were not yet widespread, may be prejudiced against new technologies. Such teachers may sometimes not want to use new technologies. This situation is frequently seen in teachers who are classified as digital immigrants (Çakır, 2013). This situation, when combined with anxiety about the learning curve, may lead teachers to completely reject the use of technology. For example, a Social Sciences teacher may have reservations about the complexity of a learning management system such as Moodle or Google Classroom and therefore avoid integrating the system into their classroom.

In order to overcome the cognitive and pedagogical barriers to technology integration in the classroom, continuous, practice-based, and teaching-related professional development programs should be organized. In addition, by creating a school culture that supports technology, teachers' concerns about change and technology can be reduced and they can be made more open to innovation. The success of technology integration depends not only on knowing the tools, but also on the ability to align these tools with pedagogical goals.

5. Time Limitations

Integration in Social Sciences courses is the difficulties teachers face in time management. Teachers who are juggling many different tasks in their daily education processes such as lesson planning, assessment, and administrative responsibilities have difficulty finding the time needed to explore, learn, and effectively implement new technologies. Social Sciences courses had a wide and diverse range of content such as history, geography, and civics (Akgün & Akgün, 2021). This requires comprehensive lesson planning and intensive content preparation. Technology integration can become even more challenging for teachers when balanced with these demands. Integrating technology effectively into the curriculum is not limited to just learning the technical features of the tools; it also requires understanding how to use these tools in a pedagogical context and incorporating them into lesson plans appropriately. For example, a teacher may want to visualize historical events using tools such as digital timelines. However, learning this software, experimenting with it, and redesigning course materials is often not possible in the face of a heavy course load.

The time-consuming process of learning and implementing new technologies can lead teachers to stick to traditional methods they know and are accustomed to. This situation limits the effective use of technology in classrooms and prevents the implementation of innovations into lessons. In addition, the effective integration of technology into lessons is directly related to teachers' participation in professional development programs. However, these processes are also hampered by a lack of time (Akgün & Akgün, 2021). In most schools, professional development programs and seminars are often limited to superficially presented information due to lack of time. Such short-term training is not sufficient for teachers to apply what they have learned in the classroom environment. The lack of long-term learning and application opportunities can limit teachers' ability to use new technologies in their lessons. For example, a Social Sciences teacher may attend a seminar to learn how to use interactive mapping software, but may not be able to apply what they have learned sustainably due to the lack of in-depth knowledge and guidance regarding the use of this software in the classroom. In addition, peer support and practice opportunities play a critical role in the professional development process (Swan, Hofer, & Levstik, 2007). However, lack of time may limit teachers' participation in such supportive activities. In order to overcome these time management problems,

planning and support mechanisms in schools need to be strengthened. Schools should provide opportunities for teachers to spend more time on technology integration. Instead of one-time professional training, long-term, practice-oriented, and guide-supported professional development programs should be implemented.

6. Pedagogical Challenges in Teaching Social Sciences

Social Science education is an education that requires a wide range of critical thinking skills, such as history, geography, and civics. However, integrating technology to support critical thinking skills comes with pedagogical challenges. Unlike other disciplines, it is quite difficult to directly integrate technology tools into the curriculum and support deep learning processes in Social Sciences teaching.

One of the biggest challenges in teaching Social Sciences is aligning digital tools with the learning objectives of the field. Social Sciences requires students to make critical analyses, understand historical contexts, and establish relationships. However, current digital tools often do not fully meet such deep learning needs. Therefore, Social Sciences education requires in-depth interaction to support students' learning processes. These interactions include student-student, student-teacher interactions in the classroom, as well as the interactive features of digital technologies added to the learning process (Avcı Akçalı & Baş, 2020). For example; in history courses, complex skills such as primary source analysis and examining events from multiple perspectives are at the forefront. While online testing platforms may be sufficient for superficial knowledge measurements, they do not serve such analytical goals. Therefore, in-depth analysis of historical events can be carried out with historical simulations and digital games that can be presented to the student. On the other hand, technology may not offer appropriate interaction solutions for every course. In civics, students are expected to engage in discussions on democratic values. However, current digital tools may fall short in effectively supporting deep inquiry and the examination of diverse views.

Many technological tools developed for educational purposes are not specifically tailored to Social Sciences content, which can make technology integration in this area more difficult. While historical simulations contribute to history education, they are often not suited to higher-level thinking skills. Geography applications such as Google Earth or ArcGIS are suitable platforms for visualizing geographic concepts, but they may not provide content directly aligned with curriculum objectives. This may require teachers to make additional customizations and adjustments when integrating these tools into lessons. Citizenship tools such as iCivics were developed to teach the basic elements of government systems and legislative processes (Avcı Akçalı & Baş, 2020). However, since such tools include the history and citizenship information of the country in which they were developed, their

content may not be appropriate for every country and situation.

Technology integration in teaching is not limited to just learning how to use the tools; it is also important for teachers to be able to use and adapt these tools following the course objectives (Swan, Hofer, & Levstik, 2007). Existing digital tools generally support superficial information transfer and are not suitable for the structure of Social Sciences that requires in-depth analysis. For example, a history teacher may have difficulty finding a simulation that will comprehensively cover the socio-economic effects of the period while teaching the industrial revolution.

In Social Sciences courses, projects and discussions that require active student participation are important (Akgün & Akgün, 2021). However, current digital tools may not be sufficient to effectively implement such activities in the classroom. General tools not designed for Social Sciences, especially those developed by other countries, may not be in line with national curriculum standards. For example, a geography teacher who wants to analyze population distribution using Google Earth may have to spend additional time and effort to align this activity with the standards.

Therefore, educational technology developers should design tools that are aligned with the unique learning objectives of Social Studies. Provide long-term, application-focused professional development opportunities for teachers to learn how to use digital tools in a pedagogical context. Provide comprehensive guides and lesson plans to help teachers align digital tools with course objectives. Using technology effectively in teaching Social Sciences is not only limited to the availability of tools but also possible through the pedagogically meaningful integration of these tools. This process can be enriched by the collaboration of both educators and technology developers.

7. Cultural and Psychological Barriers

The integration of technology in social science teaching involves not only technical issues but also cultural and psychological factors. These barriers arise from individual, societal, and institutional attitudes and perceptions that affect the adoption of digital tools (Zhao & Frank, 2003). The perceptions of educators and students towards technology directly affect the extent and how these tools are integrated into the classroom environment (Erdoğan, & Şerefli, 2021).

7.1. Attitudes Towards Technology

Individual and societal attitudes towards technology are often shaped by past experiences, digital literacy levels, and cultural contexts. These attitudes play a fundamental role in how educators and students approach technology (Akhan, 2022). In some educational environments, technology may be perceived as an interruption or distraction rather than a tool that enhances learning. Adherence to traditional educational methods may limit the adoption of digital tools. For example,

in schools that prioritize classical sources and textbook methods in history education, resistance to innovative tools such as digital simulations may be seen. This may result in the potential benefits of technology not being adequately evaluated. On the other hand, generational differences have a significant impact on attitudes towards technology (Göksu, 2020). While younger teachers and students are generally more comfortable with digital tools, older educators may be hesitant to learn and use these tools. For example, a young teacher may easily use interactive tools such as Google Earth in the classroom, while a more experienced colleague may prefer traditional maps. These differences can create inconsistencies in technology integration even within the same school.

7.2. Fear of Job Loss

The increasing role of technology in education may lead some teachers to have concerns about job security. The perception that digital tools can automate teaching processes or replace human interaction may create resistance to technology integration. In particular, the development of artificial intelligence (AI)-supported tools may cause teachers to fear that some tasks will be transferred to automation and their roles will be diminished. For example, an essay evaluation tool may reduce teachers' workload, but it may also create the perception that their pedagogical contribution to the evaluation process may be reduced (Güneş et al ., 2021). Such perceptions increase the risk of seeing technology as a threat. Teachers may be reluctant to integrate these tools into their classrooms if they believe that adopting technology may threaten their job security in the long term. For example, an automated simulation used to teach civic engagement may simplify pedagogical interactions and reduce the demand for teachers' expertise. This may overshadow the potential benefits of technology, leading to resistance.

7.3. Lack of Motivation

Lack of motivation is one of the barriers to technology adoption in Social Science teaching. The complexity of technology tools, lack of relevance, or the dominance of other professional priorities may limit teachers' efforts toward technology integration.

When teachers do not see technology tools as directly related to their curriculum goals, they may be less motivated to use these tools. However, the time and effort required to learn and implement technology may reduce teachers' motivation to use instructional technologies.

Teachers are often faced with many responsibilities such as lesson planning, student assessment, and administrative demands (Gönenç & Açıkalın, 2017). This intense workload may cause efforts to learn and implement technology not to be a priority. For example, a teacher may see preparing students for exams as a more important goal than spending time with technological tools. Cultural and psychological barriers are important factors affecting technology integration in education. In order

to overcome these barriers, strategies are needed to change educators' perceptions and enable them to see technology as an opportunity rather than a threat. However, to develop a more open attitude towards technology, cultural resistance must be combated, fears of job loss must be eliminated, and teachers' motivation must be increased.

8. Administrative and Political Obstacles

Effective technology integration in social sciences teaching depends not only on individual efforts but also on strong administrative and political support. Educational policies directly affect the process of teachers adopting digital tools by determining in which areas and to what extent technology is used (Erdoğan & Şerefli, 2021).

Institutional support is the cornerstone of technology integration in education. However, a lack of this support can leave teachers alone, especially in areas such as Social Sciences, which are often low on the priority list for technology integration. While school administrators are often more willing to support STEM (Science, Technology, Engineering, and Math) courses with technology, Social Sciences can be left out of these efforts. For example, school budgets often focus on STEM tools such as robotics kits or coding platforms, while resources such as interactive maps or digital archives for history, geography, or civics courses may not be adequately funded (Dere & Ateş, 2021). This lack of priority can leave Social Sciences teachers working with outdated resources or inadequate digital tools.

Additionally, the lack of a clear vision of technology integration by school administrators makes it difficult for social studies teachers to be motivated to incorporate digital tools into their lessons. For example, if administrators do not encourage innovative methods such as digital storytelling or historical simulations, teachers may be reluctant to use these tools in the classroom.

Limited professional development opportunities for social science teachers in technology pose a significant administrative barrier. While STEM teachers are often trained on how to use specific digital tools, social science educators may not have sufficient opportunities to learn how to use technology effectively in their classrooms (Dere & Ateş, 2021). For example, a history teacher may not receive the training they need to learn how to integrate primary source databases or geographic information systems (GIS). Such training gaps can limit teachers' efforts to integrate technology and make it difficult for them to adopt innovative methods.

Education policies are important tools that shape how and in which areas technology will be used. However, if these policies do not provide sufficient support for Social Sciences, this may prevent teachers from using technology effectively.

In many schools or educational districts, policies regarding technology integration often remain general and do not take into account the specific needs of Social Sciences (Erdoğan & Şerefli, 2021). For example, while comprehensive technology strategies are provided for STEM courses, the lack of specific guidelines for technology use in Social Sciences can leave teachers uncertain. This can lead to teachers lacking support and guidance on which tools to use and how.

While education policies often prioritize STEM subjects in resource allocation, this can lead to inequalities in access to technological tools for Social Sciences teachers. For example, a school may purchase virtual lab software for science classes but ignore digital archive platforms that could be used in history classes. This imbalance limits teachers' opportunities to use technology in their classes. School leaders and policymakers need to understand the potential impacts of technology use on learning in Social Studies and develop strategies to support this area. Policies should be created that encourage the use of tools such as historical simulations, digital archives or interactive maps.

Professional development programs specifically designed for social science teachers should be organized. These programs should ensure that teachers learn how to use digital tools effectively. For example, training in digital storytelling or geographic information systems software can increase teachers' confidence in technology integration.

School budgets and resource allocations should be distributed fairly across fields other than STEM. Supporting Social Sciences teachers' access to innovative technologies can enrich students' learning experiences in these subjects.

Administrative and policy barriers play a critical role in shaping technology integration in Social Sciences teaching. School administrators and policymakers need to recognize the importance of these subjects and the impact of digital tools on learning and provide strong support in this area. Equitable resource allocation, increased professional development opportunities, and the establishment of clear policy guidelines are key steps to increasing the adoption and effectiveness of technology in Social Sciences teaching.

9. Lack of Content and Materials

Technology integration in social sciences teaching is closely related to the availability of digital resources and the relevance of the content to the curriculum. However, the lack of specifically designed digital tools and materials in this area limits teachers' efforts to create engaging and meaningful learning experiences for students through the use of technology (Erdoğan & Şerefli, 2021).

Integrating technology into Social Sciences education is possible not only with general digital tools

but also with subject-specific materials. However, the limited availability of quality digital resources for this field prevents teachers from using technology effectively.

The number of software and digital tools designed for Social Sciences lags far behind those available for STEM courses. While simulation software, coding tools and virtual laboratories are widely available for STEM courses, interactive tools for Social Science subjects such as history, geography and civics remain very few. The number of digital platforms, especially in Turkish, is quite limited.

Existing platforms are generally general-purpose and lack content that provides depth specific to Social Sciences. For example, Kahoot! and Quizlet support general knowledge quizzes and studies, but do not offer specialized content for historical events, complex socio-political relations, or geographic analysis. Some specialized platforms, such as Mission US, provide digital storytelling for history education, but are often limited in scope and content (Timur, Yılmaz, & Timur, 2013). Social studies teachers in particular may want to address a more specific and in-depth topic, such as the rise of the Ottoman Empire or the effects of the Cold War, but they have difficulty accessing such resources.

Geographic information systems and interactive maps play a critical role in Social Science education. However, the usability and educational relevance of these tools in the classroom is often limited. While Google Earth offers extensive mapping capabilities, they often do not provide content that is directly relevant to Social Science courses, such as historical or demographic data.

9.1. Curriculum Compliance Problems

The fact that technology tools are not directly compatible with the content of Social Sciences courses makes integration even more difficult (Topal & Akgün, 2015). Educators may be reluctant to use digital resources in their courses that do not support curriculum goals. For example, a simulation to be used in a history course may simplify certain events or may not allow students to develop critical analysis skills. Such compatibility problems may hinder efforts to integrate technology into the classroom. Digital tools and platforms that support different areas of Social Sciences, such as historical events, geographical analyses, and citizenship education, should be created. For example, interactive simulations or geographic information systems can be developed to enable students to understand complex historical events. Interactive maps and tools that visualize historical and geographical data should be developed.

effectively integrate technology in Social Studies teaching, content-based barriers must be addressed. This should include not only teachers' access to existing digital tools, but also their alignment with curriculum goals and ease of use. The development of digital tools specifically for Social Studies

education and strategies that support the use of these resources can make student learning experiences more meaningful and interactive.

10. Strategies to Overcome Obstacles

Overcoming the challenges of integrating technology into Social Sciences teaching requires both increasing educators' competencies and providing the necessary infrastructure and resources. One of the most critical needs of educators in technology integration is professional development opportunities where they can continuously improve their skills and gain confidence. This support enables them to effectively use digital tools appropriate for the Social Sciences curriculum (Dere & Ateş, 2020).

Education programs for social science teachers should be designed according to their specific needs. Schools can organize mentoring programs. This way, experienced teachers can guide others. They can create environments where teachers can share their successful strategies and resources through seminars. This way, environments where teachers can share their innovative ideas are created. Effective technology integration is possible not only with access to digital resources, but also with access to a good infrastructure where these resources can be used (Kaya & Koçak Usluel, 2011).

Invest in special digital resources for Social Sciences education. Such investments allow teachers to use multimedia content more effectively in their lessons and students to benefit more from technology-supported resources. Internet access problems, especially in schools in rural areas, should be eliminated. Social Sciences teachers and IT teachers can come together and develop lesson plans by working together on how to integrate digital tools into the curriculum.

Platforms can be established where sample applications that facilitate the use of digital tools for social studies courses can be shared. Involving students in active learning processes in Social Sciences courses is a critical factor for the success of technology integration (Göksu, 2020).

Strategies to overcome obstacles should not only be limited to developing solutions for educators' needs, but should also aim to enrich students' learning experiences. When professional development, infrastructure investments, collaborative curriculum design, and practices that increase student engagement come together, technology integration in Social Sciences teaching can become more effective and sustainable. These approaches will both empower educators and ensure that students are better prepared for the needs of the future (Akhan, 2022).

11. Conclusion

Integration in social science teaching in schools is not only an opportunity for innovation, but also a multidimensional process that involves various challenges and complexities. The obstacles

discussed in this section, such as infrastructural limitations, lack of teacher preparation, content appropriateness issues, cultural and psychological resistances, and limited administrative support, make it difficult to effectively integrate technology into education. However, these challenges are not insoluble problems; on the contrary, they are critical areas that require strategic interventions for the transformation of the education system.

The digital divide makes educational opportunities unequal, especially for disadvantaged socioeconomic groups. Lack of access to technology increases learning inequalities among students, while the lack of necessary infrastructure limits teachers' uses of technology. This negatively impacts both individual learning experiences and social equality. The limited availability of relevant and original digital resources in Social Sciences education makes it difficult for teachers to create course materials that support critical thinking and encourage inquiry-based learning. While technology can be a powerful tool for deepening learning, aligning these tools with curriculum standards should be a priority.

Resistance to change is a major factor that prevents teachers from adopting technology in the classroom. Some educators face psychological barriers, such as a sense of inadequacy in using technology or fear of losing their jobs. This affects the speed at which not only individual teachers but also the overall school culture adapts to technology. Sustainable implementation of technology integration is possible not only with individual efforts but also with solid administrative support. Administrative leadership plays a vital role in issues such as investing in teacher professional development and prioritizing schools for access to technology. The key to overcoming barriers is to address technology integration in education in a systematic and multifaceted manner. It is critical to establish ongoing training and support mechanisms for teachers to gain competence and confidence in using technology. Workshops, digital resource use, and technology-supported pedagogical strategies designed specifically for Social Sciences should be developed.

Bridging the digital divide in underserved areas is essential to ensure equal access not only for students but also for teachers. Strengthening internet infrastructure and providing appropriate technological tools are key steps to achieving this goal. Collaboration between educators, instructional designers, and technology experts can contribute to the development of more effective and coherent lesson plans. Such collaborative efforts provide an integrated approach to teaching Social Studies and enrich the curriculum.

To increase technology adoption among teachers, a trusting environment should be created. Mentoring programs, support groups, and sharing success stories can reduce resistance to change. Using tools such as virtual field trips, simulations, and online collaborative projects in Social

Sciences courses can increase student engagement and deepen learning. In addition, digital citizenship education enables students to use technology more consciously and ethically. Technology integration in Social Sciences teaching is a complex process that presents both opportunities and challenges. However, overcoming these challenges will not only increase equity and quality in the education system, but also enable students to adapt to the demands of the digital age.

An effective technology integration process can help students understand complex social issues, develop critical thinking skills, and take on roles as ethical individuals in the digital world. With advances in educational technologies, Social Sciences teaching will not only become more engaging, but will also support students in becoming more informed, active citizens in society. In order to achieve these goals, all stakeholders, teachers, administrators, and information technology teachers, need to come together and work collaboratively. With joint efforts, technology integration in Social Sciences teaching can become a model of transformation and innovation in education.

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Chapter 4 - Professional Development for Technology Integration

Vural TÜNKLER

İrem ELÇİ ÖKSÜZOĞLU

Chapter Highlights

- Technology integration in education
- The role of the teacher in technology integration
- Professional development for technology integration

1. Introduction

It is advocated by all educators that today's learning environments should be aligned with the basic life skills needed by 21st century learners. Undoubtedly, this depends on teachers, who are the implementers of the curriculum, integrating technology into their teaching-learning processes or, more importantly, becoming technological literacy.

During the COVID-19 pandemic, an emergency distance education process was initiated and the use of digital technologies in educational situations has become widespread. Good guidance and policy are needed for the effective use of these technologies (OECD, 2023). The growing demand for the necessity of professional development for technology integration is evident in the rapid proliferation of studies focusing on professional development (Figure 1).

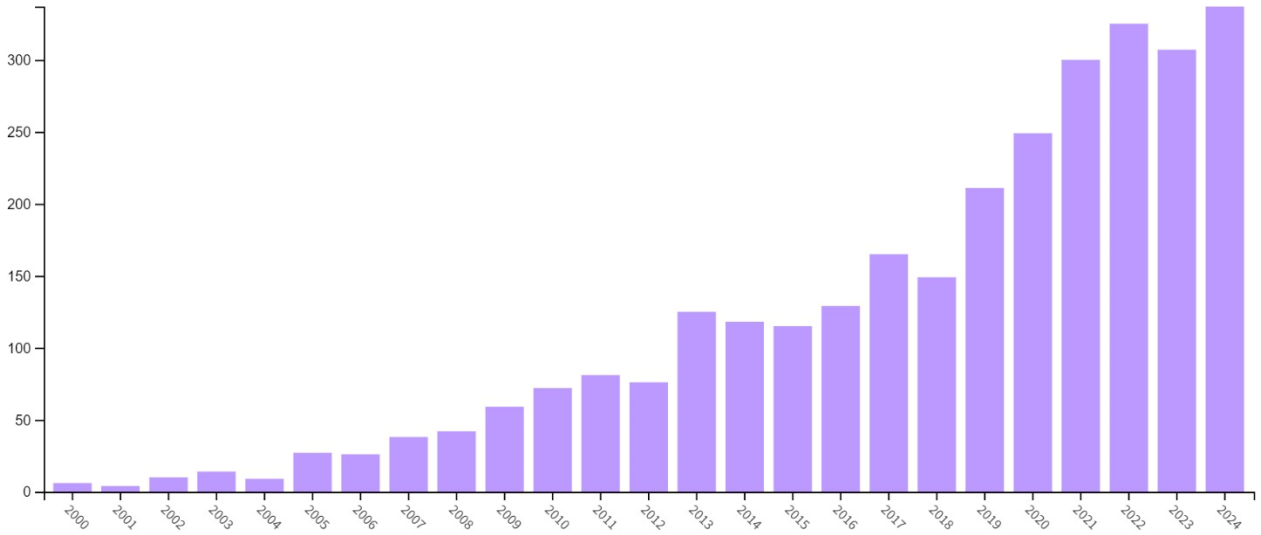

Figure 1. Distribution of technology integration and professional development activities by years

When the graph is analyzed, it is seen that studies on technology integration and professional development increase as we approach 2024. There has been a significant increase especially since 2019. This increase can be attributed to the acceleration of digital transformation in education with the COVID-19 pandemic, the widespread use of distance education technologies, and the need to improve teachers' technology integration skills. This trend reveals the demand for professional development programs to increase teachers' technological pedagogical content knowledge and competencies and to effectively integrate technology into teaching-learning processes.

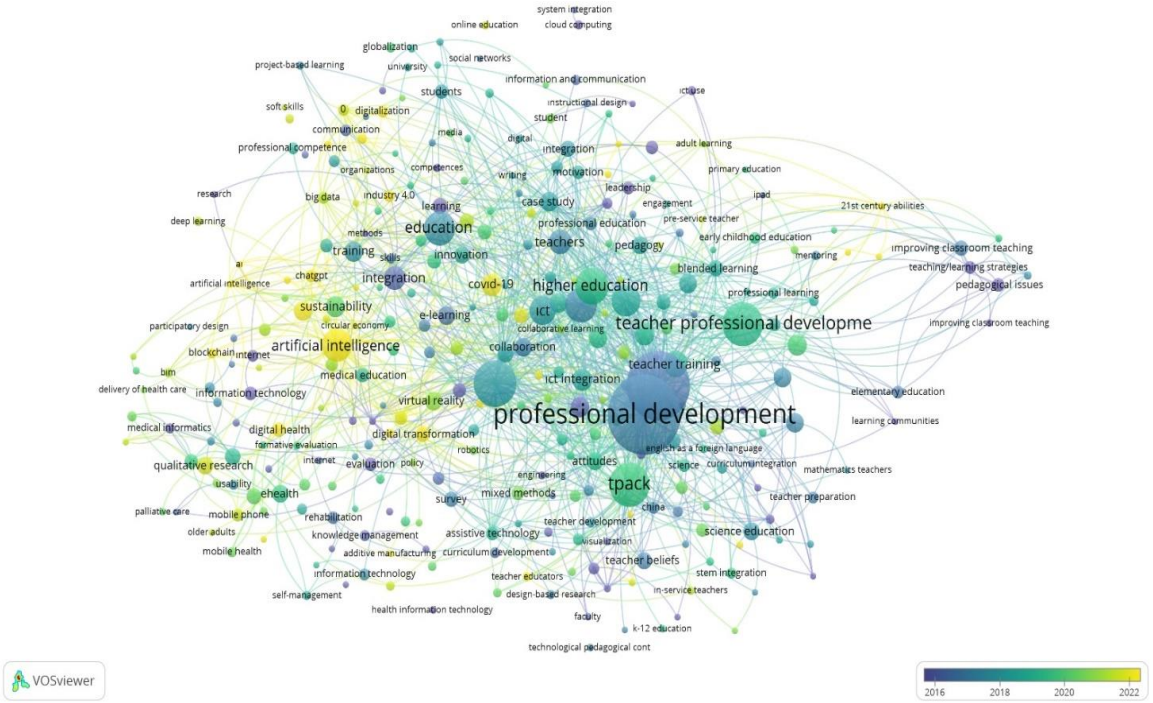

Figure 2. Co-word analysis of technology integration and professional development studies

When Figure 2 is examined, it is seen that studies in the field of technology integration and professional development in recent years have focused on important concepts such as teacher professional development, innovation, TPACK (Technological Pedagogical Content Knowledge), 21st century skills, sustainability, artificial intelligence, ChatGBT, COVID-19, online education, industry 4.0, digital transformation and big data. Developments in the 21st century and the emergence of industry 4.0 have brought the concept of teacher 4.0 to the agenda and emphasized the need for teachers to have 21st century skills (Fidan et al., 2020). One of the most emphasized skills among these skills is information, media and technology skills (OECD, 2018; Partnership for 21st Century Skills [P21], 2019). The active use of artificial intelligence tools, especially tools such as ChatGPT, by both teachers and students in educational processes (Aktay et al., 2023) has paved the way for further research in these areas in the context of technology integration and professional development.

In conclusion, technology integration in education is critical for improving student learning and responding to modern educational needs. Although technology integration in education is a process involving all educational stakeholders, it is the teacher who plans, designs and manages the teaching process. Therefore, the role and competencies of the teacher in technology integration are very important (Günüç, 2017). In order to ensure effective technology integration, there should be a lifelong professional development process in which teacher competencies can be increased. In this context, the successful integration of technology into the learning-teaching process requires the

training of well-equipped teachers who know how to learn with technology rather than learning from technology (Tezci, 2016).

2. Technology Integration in Education

Technology is defined as the accumulation of knowledge related to the production of machines and devices based on scientific knowledge, and rapid developments in this field continue to transform the world (Günay, 2017). The use of information and communication technologies in education started at the beginning of the 20th century with the widespread use of radio, and this process has been going on for about 100 years (UNESCO, 2023). However, in the last 20 years, learners, teachers and educational institutions have started to use digital technological tools widely. In particular, breakthroughs in areas such as artificial intelligence (Aktay et al., 2023), augmented reality applications (Erbaş & Demirer, 2014; Wu et al., 2013), word processors or presentation software (Parette et al., 2009) and digital graphic design tools (Fauziyah et al., 2022) have also affected teaching-learning processes. Technology has been used by teachers to facilitate lesson preparation, create course materials, track and assess students, and support individualized learning processes, both to facilitate lesson processes and to enrich students' learning experiences (OECD, 2018). However, teachers' use of these technologies does not mean that they have successfully integrated technology into their lessons.

Technology integration in education refers to the active use of current technological resources in the learning-teaching process in order to enable students to learn effectively (Günüç, 2017). In the literature, technology use and technology integration are often confused. Technology integration is a process designed to achieve learning outcomes by using current technology resources to facilitate learning (Yurtseven Avci et al., 2018). On the other hand, technology utilization refers to the use of technology as a tool to achieve the goal set in educational processes (Uerz et al., 2018). Since there is no agreed definition of technology integration in the literature, it has been seen that various definitions have been made on this subject. Dockstader (1999) defines technology integration as the effective and efficient use of technology in content areas to enable students to apply technology skills in a meaningful way. This definition emphasizes the roles of students and teachers in the technology integration process. On the other hand, Tanel (2020) defines technology integration as a concept that refers to the integration of technological tools and systems to be used with the curriculum under appropriate conditions. According to Schmitt (2002), technology integration is the integration of technological resources and technology-based applications into daily life, work and school management. ISTE (2002) defined technology integration as "*the inclusion of technology in the process to increase learning in a specific content area or in an interdisciplinary context, making it part of the functions related to teaching and making it accessible like other educational tools*" and

emphasized the increase of student learning with technology integration and making technology a part of the educational process (Mazman & Koçak Usluel, 2011).

In the process of technology integration, the teacher should determine the individual characteristics and learning goals of the students, select appropriate technology tools and methods-techniques, plan teaching activities and evaluate the student by putting the student at the center (Günüç, 2017). With technology integration, students are encouraged to active learning, cooperative learning, fun learning, critical thinking and different learning styles are supported. In addition to these, teacher-student interaction is increased, communication skills are improved and quick and easy access to information is provided (Günüç, 2017). Maddux and Johnson (2006) define technology integration in two categories as Type I and Type II. According to them, Type I includes applications that make it easier, faster or more convenient to continue teaching with traditional methods in education. In this approach, technology is an auxiliary tool for the teacher used to transfer knowledge (Tezci, 2016). Type II is used to do learning and teaching in a new, better and different way. In this application, which reflects student-centeredness, students create their own learning processes by using technology effectively and designing new materials with it. Type II applications include technology applications that allow students to be creative and productive, allowing them to make the changes they want. According to Johnson et al. (2000), successful technology integration requires the use of technologies to realize Type II practices that enable students to be active, problem-based assessment, and constructivist learning environments. Similarly, UNESCO (2023) suggests that for effective technology integration, teachers should make their teaching practices more student-centered, create engaging learning environments, and equip students with technological knowledge and skills.

3. Opportunities and Challenges in the Technology Integration Process

In the 21st century, the necessity for teachers to be versatile and equipped to integrate technology into education in order to provide the competencies expected from individuals has become more evident with the emergency distance education experiences during the COVID-19 pandemic (Çalışır & Karabacak, 2024). The pandemic has created a rapid demand for efforts to use innovative technologies in the education process (He et al., 2021). As a result, significant opportunities have emerged for technology integration in courses. The use of technology has enabled personalized learning experiences and created flexible learning environments (Nugroho et al., 2020). In addition, teachers' professional development opportunities have increased, technology integration has provided an affordable education (Nikou & Maslov, 2021) and made the learning process independent of time and space. In this way, students had the opportunity to repeat lessons at any time (Balaman & Hanbay Tiryaki, 2021; Thaariq, 2020). In addition, the use of technology has improved individuals' digital skills (Özdoğan & Berkant, 2020) and research skills (Seyhan, 2021), and

provided easy and fast access to information (Balaman & Hanbay Tiryaki, 2021; Özdoğan & Berkant, 2020; Xie et al., 2020). However, it is not yet possible to talk about a fully successful technology integration in the learning-teaching process.

In the literature, it is frequently emphasized that there are various barriers in the process of integrating technology applications and resources into professional practices. These barriers include lack of digital infrastructure (UNESCO, 2023), lack of materials (Çakın & Külekçi Akyavuz, 2020; Esfijani & Zamani, 2020; Noor et al., 2020; Özdoğan & Berkant, 2020; Pota et al., 2021), lack of communication and interaction (Avcı & Akdeniz, 2021; Nikou & Maslov, 2021), technical problems and connection problems (Balaman & Hanbay Tiryaki, 2021; Husain et al., 2020; Özdoğan & Berkant, 2020; Singh et al., 2020), teachers' lack of TPACK (Alala, 2022; Çoklar et al., 2007), integrating content knowledge with technology (Elçi & Tünkler, 2022), privacy and security concerns (Joshi et al., 2020), lack of time for technology integration (Hixon & Buckenmeyer, 2009; Francom, 2020), teacher competencies and lack of administrative support (Francom, 2020), and stakeholders' attitudes, beliefs and perceptions (Günüç, 2017). As recognized in the Incheon Declaration, six of the ten indicators of quality education among the sustainable development goals are related to technology (UNESCO, 2015, 2023). Technology integration into the education process is a necessity both to overcome current challenges and to improve learning processes. Professional development policies, with the support of policy makers and school administrations, can play a decisive role in overcoming the barriers to technology integration and improving the process. In conclusion, technology integration in education makes teaching processes more effective, accessible and efficient, and offers important strategic solutions to overcome the challenges faced. Teachers who can use technology effectively are at the center of this integration process and play a decisive role in the success of integration.

4. Teacher's Role in Technology Integration

The flexibility that information and communication technologies (ICT) provide to the learning environment, their potential to increase student achievement, and their economic and social impacts have brought the more effective use of these technologies in education to the agenda (Tezci, 2016). Teachers, who are the planners of the teaching-learning process, are expected to integrate technology into various aspects of their professional practices, such as effective communication with students and parents and continuing their professional development (UNESCO, 2023). This integration ranges from supporting lesson plans with digital tools to using online platforms to track student performance and provide feedback. There are various competencies that teachers should possess in order to successfully integrate technology into their classrooms and respond to the needs of 21st century learners.

In the 21st century, due to the rapid developments in the field of knowledge, there are significant changes in teacher roles and the competencies and skills of teachers in relation to these roles (Kabakçı Yurdakul, 2011). 21st century skills refer to skills that are different from 20th century skills and are necessary for students to cope with the demands of the age (Anagün, 2018). These skills include basic skills such as critical thinking, effective communication, problem solving, flexibility, collaboration, creativity, communication, innovation, teamwork, decision making, leadership, applying knowledge, global awareness, self-management and learning to learn (P21, 2019). The most widely accepted framework among 21st century skills in the literature is proposed by the Partnership for 21st Century Skills (2019) (Figure 3).

Figure 3. Framework for 21st century learning (P21, 2019)

This framework includes the knowledge, skills and competencies that students need to be successful in work, life and citizenship. According to the 21st century learning framework, the skills that individuals should possess are categorized under three headings: life and career skills, learning and innovation skills, and information, media and technology skills. Learning and innovation skills consist of creativity and innovation, critical thinking and problem solving, communication and collaboration skills that students need to prepare for a more complex living and working environment. Life and career skills refer to students' competencies to be flexible and adaptable, take initiative and self-manage, participate in social and intercultural interactions, be productive and accountable, and have the potential to manage responsibilities and lead. Information, media and technology skills include students' ability to generate, evaluate and effectively use information, media and technology. According to the P21 framework, in today's environments enriched by

technology and media, access to information sources, rapid changes in technology tools and collaboration skills have become important. Therefore, individuals need to be able to produce, evaluate and effectively use information, media and technology. Individuals can be effective in this regard only if they have information literacy, media literacy, information and communication technology literacy skills (Gelen, 2017; P21, 2019).

It is only possible for students to have the skills required by the new century if teachers also have 21st century skills. Teachers who have these skills can be role models for students by integrating technology into their lessons and enable them to become technologically literate (UNESCO, 2023). Indeed, when the Education System Alignment for 21st Century Skills (Care et al., 2019), The Future of Education and Skills [OECD] (OECD, 2018), Assessment and Teaching of 21st Century Skills [ATCS21S] (Care et al, 2018), National Educational Technology Standards (ISTE, 2016) and Skills and Capacity [HEART] (Dunbar, 2015) are examined, it is seen that one of the common skills identified and emphasized is "information, media and technology skills".

Technology literacy is the ability of individuals to evaluate information on digital platforms, use digital tools effectively, be aware of online security risks, and follow technological innovations (Karabacak & Sezgin, 2019). Technology literacy stands out as an important determining factor in the integration of technology into education (Dinçer, 2018). Therefore, teachers need to be technologically literate and ensure that students have these skills. The National Educational Technology Standards (ISTE, 2004) emphasize that in order for teachers to be technologically literate, they should have a good understanding of the basic concepts and processes of technology and educate students accordingly. According to these standards, teachers should know the concepts related to technology and be able to teach them to students, be familiar with existing technology, and continuously improve their technology knowledge and skills in order to keep up with new technologies. Teachers who are technological literacy need to use technology both effectively in the learning environment and continuously use technology and research to create learning experiences that are appropriate to students' individual needs, implement curriculum plans that maximize student learning with technology-supported teaching methods and strategies, assess student learning using technology, improve instruction by analyzing data, and use a variety of methods to measure students' technology use skills. Teachers need to provide continuous professional development through technology, comply with ethical and legal rules in the use of technology, support diverse student groups, promote safe use, and provide equal access to all students.

The importance of the relationship between this literacy and educational content has been demonstrated by the Technological Pedagogical Content Knowledge (TPACK) model developed by Mishra and Koehler (2006). The main focus in this relationship is that teachers must first be

technologically literate in order to use technology effectively in education (Dinçer, 2018). As a matter of fact, teachers should develop their technological literacy skills in order to improve their competencies related to technology, pedagogy and field and to use these skills well in teaching-learning processes (Yanpar-Yelken et al., 2013; Yusufoğlu & Gençtürk Güven, 2021).

TPACK Model is a teacher knowledge model proposed by Mishra and Kohler (2006) by integrating technological knowledge in parallel with today's technological developments into the Pedagogical Content Knowledge concept developed by Shulman (1986) (Kaya & Yılayaz, 2013) (Figure 4).

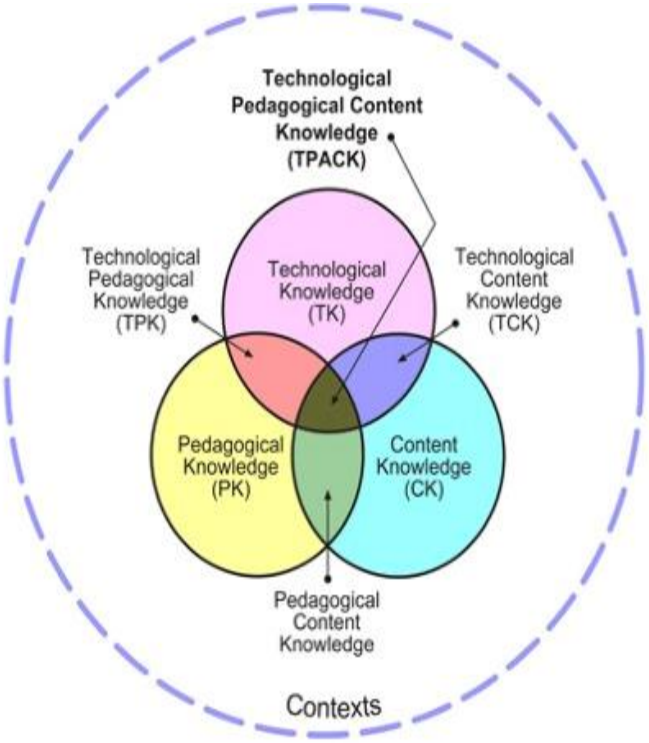

Figure 4. Technological pedagogical and content knowledge framework (Mishra & Koehler, 2008)

In the TPACK model, the three basic knowledge areas that teachers should possess, namely content knowledge, pedagogical knowledge and technological knowledge, are both interrelated and interactive. This model emphasizes that all three knowledge areas are equally important and that teachers should create an effective learning environment by combining these areas. These teachers, who have adopted innovation and student-centeredness as their educational vision and philosophy, have been described as Teacher 4.0. Teacher 4.0 are teachers who know and closely follow technopedagogical approaches, support the teaching-learning process with digital tools, and know and use blended teaching practices (Konca, 2021).

International organizations have developed standards that identify the interplay between content, pedagogy and technologies, arguing that educators need to have technological competencies as well as professional skills in line with the development of technology in the 21st century. The International Society for Technology in Education (ISTE) has empirically designed educator standards to provide educators with a roadmap for effective technology integration. According to the standards set by ISTE (2017), the competencies that teachers should possess are categorized under seven main headings (Figure 5).

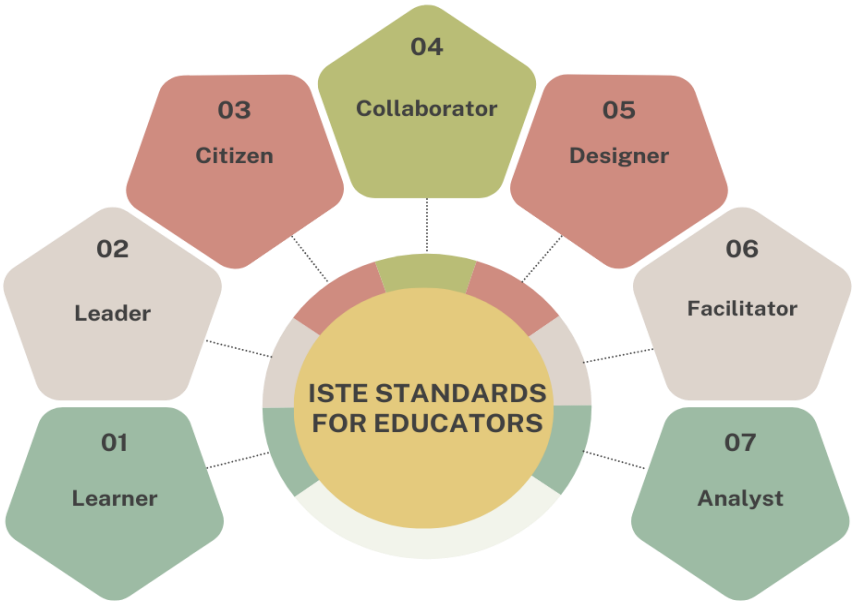

Figure 5. ISTE standards for educators (ISTE, 2017)

1. Learner: Educators continually change or update their educational practices by learning from and with others, exploring technological applications with proven impact to improve student learning.
2. Leader: Educators seek leadership opportunities to support student achievement in all areas and to provide effective teaching and learning.
3. Citizen: Educators encourage students to contribute positively and participate responsibly in the digital world.
4. Collaborative: Educators take time to collaborate with both colleagues and students to improve practice, explore and share resources and ideas, and solve problems.
5. Designer: Educators recognize the varied nature of learners and design authentic, learner-centered activities and environments that can adapt to the varied nature of learners.
6. Facilitator: Educators use technology to support and facilitate student learning.
7. Analyst: Educators understand and use data to guide their teaching and support students' achievement of learning goals.

UNESCO, one of the leading organizations pioneering and working on educational technology applications, has prioritized the need to improve teachers' technology literacy skills within the scope of ICT Competency Standards for Teachers (UNESCO, 2018) (Figure 6).

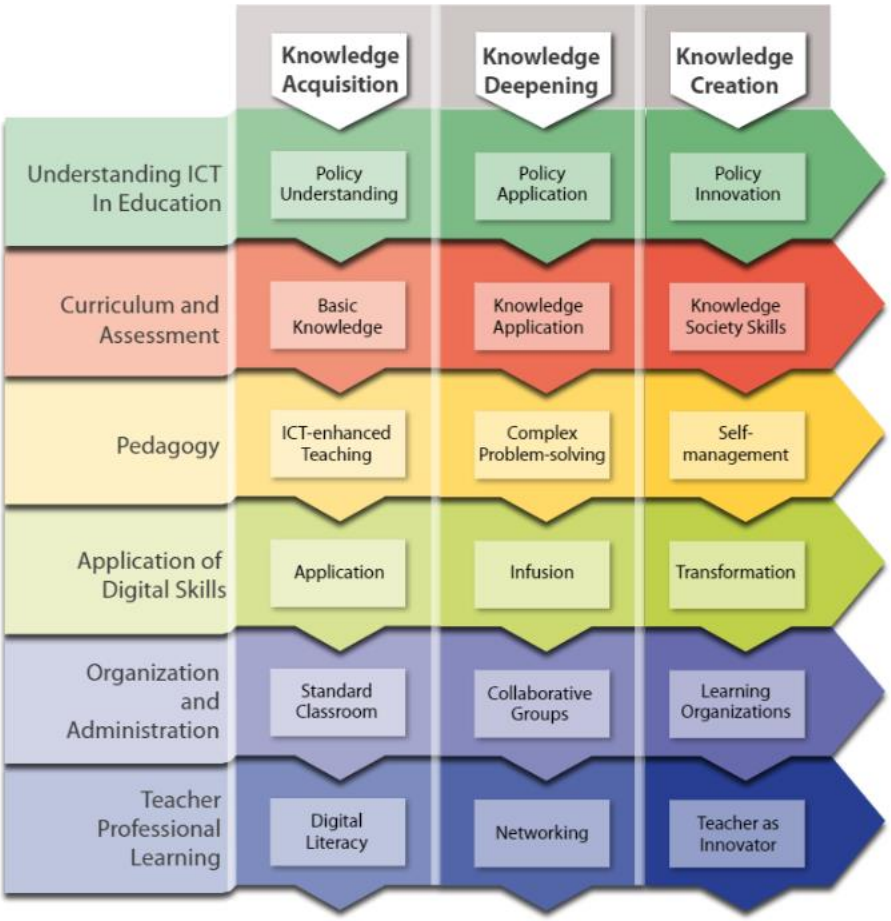

Figure 6. UNESCO ICT competency framework for teachers (UNESCO, 2018)

The successful integration of ICT into learning environments depends on teachers' ability to structure learning, integrate technology into pedagogical approaches, create active classrooms and encourage collaborative practices. Teachers' professional learning is seen as a critical component of the technology integration process. As indicated in Figure 6, the ICT Competency Framework for Teachers (CFT) organizes the eighteen competencies related to ICT in Education into three levels, each consisting of six dimensions. Each level is related to how teachers typically adopt technology. The ICT CFT intersects the three levels (knowledge acquisition, knowledge deepening and knowledge creation) with six aspects of a teacher's work (understanding ICT in education policy, curriculum and assessment, pedagogy, application of digital skills, organization and management, and teacher professional learning) to create 18 competencies. The approach a country, region or school adopts depends on the extent to which ICT is integrated into society and contextual parameters (UNESCO, 2018).

Although teachers have knowledge, skills and positive attitudes towards technology use, it is not possible to talk about a high level of technology literacy skills and successful technology integration (Dinçer, 2018; Günüç, 2017). 21st century teachers need continuous support to effectively integrate

technology into their learning-teaching processes as technology literate. In this context, guidance on technology integration should be provided for teachers to have relevant competencies (Crompton, 2023). In short, pre-service and in-service professional development activities should be organized for teachers to integrate educational technologies into teaching (Elçi & Tünkler, 2022; Erişti et al, 2012).

5. Professional Development for Technology Integration

It is seen that different concepts such as pre-service training, in-service training, in-service learning, professional learning, professional development, teacher training, teacher development are used when talking about teachers' professional development (Özer, 2008). While teacher training and pre-service education refer to the preparatory training that teachers receive before they start their profession, other concepts are processes designed to improve teachers' knowledge, skills and attitudes while they continue their profession and to ensure progress in students' learning (Guskey, 2000). Although there is no universally accepted definition of professional development in the literature, it is known that the aim of professional development is to increase one's professionalism (Evans, 2015). Professional development process covers what teachers learn through formal, non-formal and informal education over a long period of time from pre-service and in-service training practices to retirement (Güneş, 2016). The professional development process (Sünbül, 2001), which is organized to provide teachers with spatial, educational and individual competencies, is a comprehensive and sustainable education carried out before and during the service to increase the efficiency of educators' performance and the success of students.

The 21st century digital trends have made it necessary to equip teachers with the skills to keep pace with change. Although pre-service teachers, which is the first step of teacher education, are trained in technology integration through various courses, rapid changes in science and technology, innovations in school systems, developments in teachers' areas of expertise, and advances in instructional technology have caused the professional training to become outdated (Boydak Özan et al., 2014; Saban, 2000). For this reason, teachers have started to need in-service professional development for technology integration (Şahin, 2023). According to Carlson and Gadio (2002), for technology-focused professional development programs to be successful, professional development should include the following elements:

- Aiming to increase student achievement,
- Developing basic technology literacy skills and actively using these skills in the classroom,
- Acting as a guide and facilitator,

- Learning together with colleagues and continuing professional development.

According to Frei et al. (2007), peer learning is important in professional development for technology integration. Teachers can get help from their colleagues or technology leaders in solving problems encountered in the technology process. In addition to peer learning, professional journals where current developments in the field of educational technology can be followed, professional publications such as scientific articles or books written on this subject are important reference sources for teachers in the professional development process. In addition, there are opportunities for professional development in a synchronous or asynchronous manner using various online resources. Furthermore, various international organizations have become a driving force for the integration of technology into education. For example, in the ICT CFT, UNESCO (2018) describes teacher development as a continuous learning process. Teachers' learning and practicing digital skills is an integral part of their professional development from pre-service to retirement. In pre-service education, it is aimed to provide pre-service teachers with TPACK by teaching knowledge and pedagogical approaches specific to their field and emphasizing the importance of technology for teaching-learning processes. However, in order to realize this goal, a lifelong education should be planned through in-service training and teachers should be ensured to keep up with the constantly developing technology applications. In addition, UNESCO has deemed it necessary to develop teachers' skills in applying ICT-based pedagogy in important issues such as classroom management, curriculum implementation, student assessment, and collaboration with colleagues in their continuous professional development (UNESCO, 2018). Beyond using technology, it is valuable for teachers to integrate technology into different areas of education to create a more productive working environment with students and colleagues.

According to the P21 (2019) framework, 21st century support systems and 21st century professional development should be considered for the effective realization of learning and innovation skills, information-media and technology skills, and life and career skills. This professional development system should include the following elements:

- Highlighting ways in which teachers can integrate 21st century skills, tools and teaching strategies into their classroom practice and helping teachers to understand what activities they can do,
- Demonstrate how a deep understanding of the subject matter can develop problem solving, critical thinking and other 21st century skills,
- Creating classroom practices for teachers that promote the development of students' 21st century skills,

- Improving teachers' ability to identify students' specific learning types, intelligences, strengths and weaknesses,
- Creating supportive environments for teachers to develop skills in using a variety of teaching and assessment strategies (to reach different learners),
- Supporting continuous assessment of 21st century skills gains in students,
- Encourage knowledge sharing using face-to-face, virtual and blended forms of communication,
- Using a scalable and sustainable professional development model.

As a result, 21st century professional development plays a critical role for effective technology integration as a system to enable teachers to effectively integrate skills and strategies in the classroom (Tariq, 2024).

6. Conclusion

Technology integration is the process of effectively and efficiently integrating technology into content areas in order to ensure the meaningful application of students' digital skills (Dockstader, 1999). Technology integration has become important for all educational stakeholders in order to enable individuals to meet the modern educational expectations of the 21st century and to facilitate the teaching-learning process. Although the success of technology integration in education is related to the efforts of all stakeholders, teachers are the ones who plan, manage and guide the teaching process. For this reason, teachers' pre-service and in-service trainings and the experiences they gain as a result of their individual efforts are among the important factors affecting the success of this process (Guven & Gulbahar, 2005; Şendurur & Arslan, 2017). The role of teachers in technology integration is to create engaging learning environments for students by putting students at the center and equipping them with technological pedagogical knowledge and skills to achieve the targeted learning outcomes (UNESCO, 2023). Fulfilling the roles and responsibilities expected from teachers depends on the creation of quality professional development programs for effective technology integration.

In professional development for technology integration, it is essential to strengthen teachers' technological pedagogical content knowledge that will enable them to increase student achievement, to have technological literacy skills and integrate these skills into all teaching-learning processes, to act as guides and facilitators, to learn with colleagues and to ensure sustainability in professional development. The relationship between technology integration and professional development not only improves teaching processes, but also contributes to educators' continuous learning and keeping

up with current technologies, helping to create a teaching ecosystem that meets the educational needs of the 21st century.

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Chapter 5 - Technologies for Digital Classrooms

Turhan ÇETİN

Hüseyin KARAASLAN

Chapter Highlights

- Differences between digital classrooms and traditional classrooms
- Approaches to technology integration in classrooms
- The use of technology in digital classrooms for social studies

1. Introduction

The rapid development of Information and Communication Technologies (ICT) has paved the way for their use in education. As a result, ICTs have been integrated into classrooms, giving rise to the concept of digital classrooms. Digital classrooms, through the use of ICTs, have made educational practices faster and more efficient (Özerbaş & Erdoğan, 2015, p. 358). In the literature, digital classrooms are also referred to as smart classrooms (Yu, Shi, Li & Yang, 2022).

In his study on digital classrooms, focusing on the New Zealand example, Roberts (2007, p. 32) illustrated the concept of digital classrooms using a diagram. This depiction was developed based on observations of various classrooms and interviews with teachers. The diagram is presented in Figure 1.

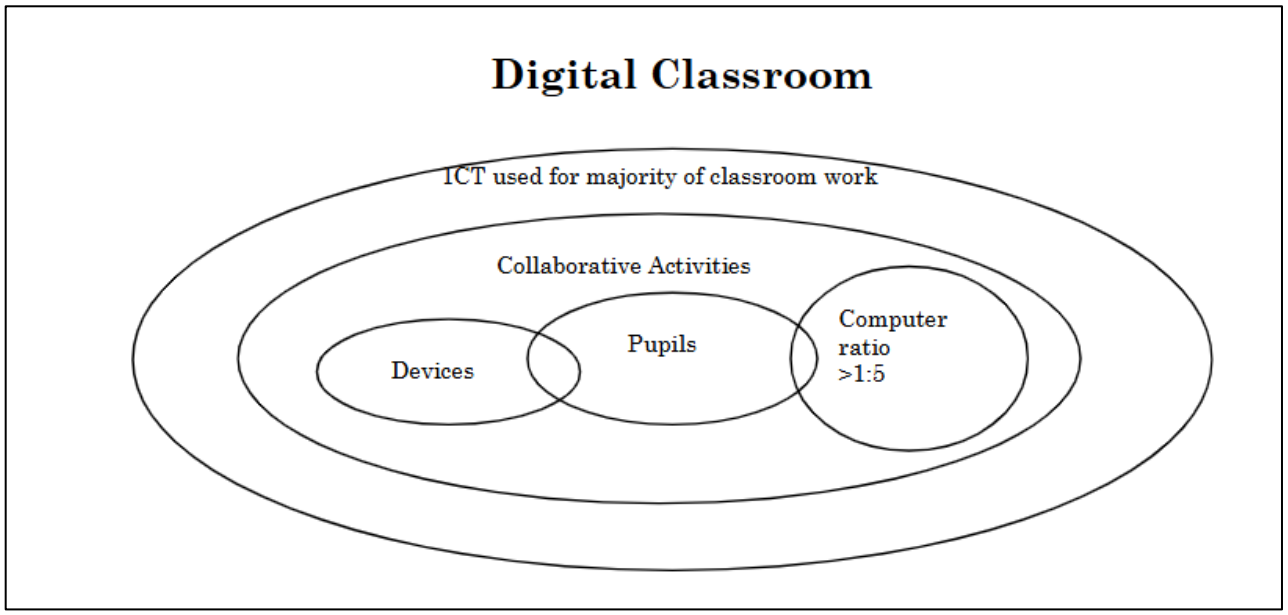

Figure 1. Depiction of digital classroom

Upon reviewing Figure 1, it is evident that ICT is used extensively in the majority of classroom activities, with a strong emphasis on collaborative tasks. The figure also suggests that it is essential for students to interact with technological devices. Although the situation can be considered relative, the figure indicates that the ratio of students per computer is five.

Education and technology are not contradictory concepts but rather complementary ones. Equipping classrooms with technology enriches the teaching and learning process. As a result of this enrichment, the concept of the digital classroom has emerged, which is truly revolutionary (Singh, 2021, p. 21).

2. Differences Between Digital Classrooms and Traditional Classrooms

The term "traditional" is a flexible concept that adapts to the context in which it is used in. Essentially, it represents an effort to name and define a standard for comparison. For instance, a researcher exploring the integration of the metaverse into the educational process might label digital classrooms as "traditional classrooms" to draw a contrast with metaverse-based classrooms. In this context, the term "traditional classroom" serves as a reference point to help clarify the concept of the digital classroom. As a result, the literature offers varying definitions of the traditional classroom. For example, Bakar (2016, p. 58) defines the traditional classroom as a space enclosed by four walls where learning occurs within those confines, offering little opportunity for exploration. Traditional classrooms have gradually evolved from the 18th century to the 2000s. Following the 2000s, advancements in technology facilitated the integration of traditional classrooms with the digital world, and digital elements began to be incorporated into classroom settings (Çelik & Kasimoğlu, 2019). Although classrooms had long utilized materials such as tape recorders, vinyl records, televisions, and CDs, the advent of the internet made education independent of time and space possible (Babić, 2011, p. 1299). Examples illustrating the differences between traditional and digital classrooms are provided in Table 1.

Table 1. Differences between digital and traditional classrooms

Traditional Classroom	Digital Classroom
• Notebooks are frequently used. • Textbooks are commonly utilized. • The board and markers are among the most essential tools. • The process is teacher-centered. • Homework is regularly assigned.	• Students interact with computers. • Collaborative digital projects are common. • Internet access is available in the classroom. • Students engage in both the production and consumption of digital content. • Technology, with its ubiquity, enables the learning process to extend beyond the physical classroom and scheduled class hours.

3. Approaches to Technology Integration in Classrooms

Hamilton (2015, pp. 46-57) identifies five main categories for achieving technology integration in classrooms. She provides detailed explanations of these categories and presents their advantages and disadvantages in a tabular format. A summary of this information is compiled in Table 2.

Table 2. Technology integration models proposed by hamilton

Integration Approach	Description	Advantages	Disadvantages
Instructional Use Only	Refers to a digital tool controlled by the teacher. For example, a single computer used exclusively by the teacher in the classroom can serve as an example.	• Comfortable starting point • Low risk • Teacher controls technology • Can engage whole class at once • Good for modeling	• Passive for students • Does not build student technology competency
Software/Websites	Represents educational software and websites designed for learning purposes.	• Fairly low risk • Outcome dependent on quality of teacher's choice • Students are active • Pacing is consistent across student groups • May engage students in simulations and problem solving • May promote student-student talking • May build students' conceptual skills	• Limited differentiation • May be boring • May replicate basic fact drills • Usually does not build students' technology competency • Requires sufficient computer access
Noncomputer tools	Encompasses electronic devices other than computers, such as digital cameras and audio recording devices.	• Low to moderate risk • Possible familiarity • Often student controlled • Builds teamwork	• Teachers' management of equipment and products can be time-consuming • Can become complicated with editing and

		• Encourages imagination • Does not require much computer access	production processes
Teacher-Directed Projects	Refers to activities where students initially have limited skills but develop them through teacher-guided practice, such as drawing exercises.	• Integrates technology with content • Keeps students involved • Scaffolds technology skills • Keeps end products consistent	• Greater risk of something going wrong • Minimal differentiation • May have fast and slow finishers
Web 2.0 Tools	Refers to tools that facilitate both the production and consumption of knowledge.	• High student motivation • Typically low learning curve • Differentiated by content • Authentic interactions with others for authentic purposes	• Needs significant monitoring • Needs explicit instruction and modeling for online communication • Must comply with COPPA (privacy laws) • Requires sufficient computer access
Technology Centers	Includes tools that combine the lesson content with digital technology, fostering active student interaction. These tools enable students to engage in activities such as writing exercises or preparing presentations.	• Equal access with limited equipment • Students control the technology • Differentiated by student ability • High student motivation	• Needs consistent planning • Requires students to troubleshoot • Requires training students
Teacher Collaborations	Involves collaboration among teachers on topics like implementing and evaluating technology in the classroom.	• Lowers risk of something going wrong • Distributes the workload of planning and implementation • Builds capacity in teachers • May engage students in differentiated work • Builds students' technology	• Dependent on good collaboration • Requires coordinated planning

		skills	
Project-based Learning	Describes processes where students encounter complex problems and work on finding solutions.	• High level of student autonomy • Students control technology • Naturally differentiated • Builds students' technology skills	• Higher risk • Needs consistent monitoring • Students may end at different times • End products may differ considerably

4. The Use of Technology in Digital Classrooms for Social Studies

This section will provide specific examples of how technology is utilized in digital classrooms, with a focus on its application in social studies. To achieve this, various uses of technology will be explained, and examples from relevant literature will be presented. Particular emphasis will be placed on examples drawn from studies in the field of social studies education. The integration of digital classrooms in social studies teaching holds significant importance. Hawley and Hughes (2023, p. 404) emphasize that social studies should be a subject where students actively engage with emerging technologies. Additionally, they argue that this field should evolve into a space where students assess the societal impacts of technological advancements and reflect on how they, as participatory and democratic citizens, can respond to these changes.

5. Web 2.0 Tools

The term Web 2.0 refers to tools that allow users to actively modify and interact with content, moving beyond the one-sided engagement typical of Web 1.0 technologies (Bozkurt, 2013, p. 690). Today, Web 2.0 tools are employed across various fields of education for different purposes. Examples of Web 2.0 tools suitable for educational use include assessment and evaluation tools, mapping tools, virtual reality tools, bulletin board tools, classroom and content management tools, presentation tools, infographic tools, language learning tools, social networking tools, and cartoon creation tools (Kırımlı & Demirezen, 2022, p. 530). A wealth of research highlights the positive impact of Web 2.0 tools on social studies courses. For example, in a study by Almalı and Yeşiltaş (2020), Web 2.0 tools were used to teach geography topics in a 6th-grade social studies class. The results indicated that these tools significantly enhanced students' academic performance and their attitudes toward the subject. Similarly, Çelik (2021) conducted a study with pre-service social studies teachers, exploring their experiences with using Web 2.0 tools in formative assessment contexts. The findings revealed that participants perceived Web 2.0 tools as offering both enjoyable and lasting learning experiences.

6. Digital Maps

Digital maps are dynamic, editable maps that can be accessed on devices such as computers, smartphones, and tablets. They are currently the most widely used type of map (Balcı & Yıldırım, 2023, p. 154). In recent years, the use of digital maps in education has increased significantly. While they are predominantly employed in teaching geography, their application extends to other fields, such as history. In education, digital maps serve two primary purposes. First, they act as an information resource for students. Second, they foster a critical perspective by engaging students in the design and analysis of maps (Jones et al., 2004, p. 92). This dual functionality, particularly their prominent role in teaching geography and history topics, makes digital maps a vital resource for social studies courses. For instance, İnel and Çetin (2017) conducted a study using digital maps in a 6th-grade social studies class. Their findings revealed that digital maps captured students' attention more effectively than printed maps, demonstrating their potential to enhance engagement and learning outcomes.

7. Metaverse

Although the concept of the metaverse may seem relatively new, its etymological roots date back approximately 30 years. At first glance, the metaverse can be understood as an integration of the real and the virtual. This concept encompasses virtual universes with dimensions spanning various domains such as art, culture, economy, and entertainment (Çelik, 2022, pp. 68–71). To gain a deeper understanding of the metaverse, it is helpful to examine Radoff's (2021) Metaverse Value-Chain, which outlines the expanding layers of the metaverse. Frequently referenced in the literature, these layers are described from the innermost to the outermost. For examples associated with each layer, insights from the study by Setiawan et al., (2022) can be utilized:

- Infrastructure: 5G, WIFI 8, 6G, Cloud.
- Human Interface: Smartglasses, Wearables.
- Decentralization: AI Agents, Microservices, Blockchain
- Spatial Computing: 3D Engines, VR/AR/XR.
- Creator Economy: Design Tools, Asset Markets.
- Discovery: Ratings, Stores, Agents.
- Experience: Games, Social, Esports, Theater, Shopping.

Examining the layers of the metaverse provides valuable insights into its dimensions and facilitates a better understanding of the concept. Building on this framework, tools such as games, smart glasses, and wearable devices can be considered potential resources for use in education. Hamarat and Dallı (2022) explored the use of the metaverse specifically in social studies education. They argued that integrating the metaverse into the classroom could make lessons more interactive, enhance learning

processes, and accelerate the comprehension of abstract concepts, thereby offering significant educational benefits.

8. Conclusion

The increasing influence of technology across all areas of life has also made it a central feature of classrooms. The integration of technology into education gave rise to the concept of the digital classroom. Although the digital classroom initially emerged with the introduction of tools like tape recorders, televisions, and vinyl records, it has since evolved into a more abstract and dynamic concept. New technological opportunities have continued to find their place within this framework, transforming the traditional classroom—defined by chalkboards, markers, textbooks, and worksheets—into a modern, technology-driven environment. This new concept of the digital classroom aligns closely with the needs of social studies education. In this context, this study focuses on the integration of Web 2.0 tools, the metaverse, and digital maps into digital classrooms. While the digital classroom can encompass a wide range of technological elements, these three examples were selected to maintain focus and coherence. Each of these technologies contributes uniquely to social studies education. Web 2.0 tools enable students to collaborate and produce content together. The metaverse provides a virtual space for students to simulate real-world scenarios, preparing them for real-life challenges through immersive practice. Meanwhile, digital maps enhance students' understanding of geography and history by providing a spatial context for the topics they study. In conclusion, the integration of digital classrooms into social studies lessons offers substantial educational benefits, supporting interactive, engaging, and effective learning experiences.

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PART II- TECHNOLOGY INTEGRATION IN SOCIAL STUDIES

Chapter 6 - Technology Integration to Social Studies: Why is it Necessary?

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Chapter Highlights

- Technology integration in education
- Theoretical framework of social studies education and current approaches under NCSS standards
- Technology integration in social studies education
- Examples of technology use in social studies education

1. Introduction

In today's rapidly digitalizing world, the integration of technology in education holds significant value for enriching learning processes and providing students with necessary skills. The continuous and rapid advancement of technology has led to profound changes in the educational field, reshaping teaching processes through digital tools and resources. This transformation not only facilitates access to information but also makes instructional methods more interactive and engaging, thereby promoting active participation in the learning processes (Ertmer & Ottenbreit-Leftwich, 2010). For instance, technological devices such as smart boards, tablets, and interactive software enhance the visual and auditory presentation of course materials, increasing students' interest and participation in classes (Higgins, Xiao & Katsipataki, 2012). These tools help make complex concepts more comprehensible and encourage active involvement in learning. Digital simulations and augmented reality (AR) applications enable students to experience historical events and geographical processes in a more tangible and interactive manner (Spicer & Dede, 2009). Thus, students can reinforce abstract information with concrete experiences, making their learning processes more effective.

The use of technology in education also enhances skills in accessing, analyzing, and creatively utilizing information. Digital resources and data analytics tools enable students to critically evaluate information and find more creative solutions while creating their own projects. For example, students can conduct research by accessing online databases, analyze their findings, and share this information through presentations or reports. This process not only strengthens students' analytical thinking and problem-solving skills but also increases their digital literacy. Thus, technology integration develops students' abilities to make informed decisions, preparing them for the digital world of the future (Ng, 2012).

Additionally, the use of technology in education supports collaborative learning. Online platforms and digital tools facilitate group work, idea exchange, and the development of joint projects among students (Voogt & Roblin, 2012; Mishra & Koehler, 2006). Such collaborative environments not only help students enhance their communication skills and adapt to teamwork but also improve their ability to appreciate diverse perspectives. Particularly in disciplines like social studies, students' acquisition of knowledge about different cultures and societal structures and their discussions on these topics strengthen their awareness of global citizenship (Trilling & Fadel, 2009).

The National Council for the Social Studies (NCSS) emphasizes the importance of technology integration in social studies education and details the opportunities it offers to students. According to NCSS, incorporating technology into educational processes not only facilitates students' access to

information but also makes their learning experiences more interactive and dynamic. In this context, it becomes possible for students to enhance their creativity using various digital tools (NCSS, 2013).

Social studies is fundamentally important for understanding the history, geography, economy, and culture of a society. This discipline aims to develop students' abilities to analyze complex social and cultural structures, interpret historical events, and evaluate contemporary societal issues. To achieve this, it is necessary to enhance students' skills in understanding and interpreting information. Technological tools play a significant role in fostering these skills. For example, the use of digital maps and Geographic Information Systems (GIS) allows students to analyze spatial data and better understand geographical information through visualization. These tools not only provide access to information but also support students in critically evaluating and interpreting this information (Heafner, 2004; Jenkins, 2005).

Technology integration enriches teaching methods in social studies classes, offering students more comprehensive and in-depth learning experiences. For instance, through digital archives and virtual museums, students have the opportunity to examine historical events and cultural heritage in a more tangible and visual manner. This not only reinforces abstract concepts with concrete experiences but also strengthens their processes of gaining historical perspective. Additionally, online platforms and collaborative digital tools facilitate group work, idea exchanges, and the development of joint projects, thereby promoting collaborative learning. Such interactive learning environments aid in enhancing students' communication skills and adaptability to teamwork while also improving their ability to consider different perspectives (Bailenson, 2018).

In social studies education, technology integration facilitates students' easier access to information, enhances interactivity in learning, and boosts creativity through digital tools. This utilization supports the development of critical thinking, problem-solving, and collaborative skills essential 21st-century competencies and fosters a greater awareness of global citizenship. Strategic and effective deployment of this technology by educators is critical to the success of modern education systems. For students to thrive in a digital world, acquiring these skills is imperative, with technology serving as one of the pivotal supports in this endeavor (Braun, 1999; Farisi, 2016; Heafner, 2004; NCSS, 2013; Tünkler, 2022, 2023)

2. Technology Integration in Education

The relationship between education and technology is emerging as one of the fundamental dynamics of today's education systems. Technological changes and advancements have radically transformed how educational institutions operate (Chen, 2004). Digital transformation is enriching learning environments, enhancing educational quality, and contributing to students' development

across various fields (Can Yaşar et al., 2012; Sayan, 2016). In this context, the increasing importance of technology in education significantly contributes to students realizing their potential. Researchers like Timmerman (2000) point out that current educational methods and strategies can sometimes be insufficient, advocating for increased use of technology to address these deficiencies.

The mutual complementarity between education and technology necessitates the use of technological innovations in all areas of modern education systems. Developments in technology are providing new perspectives to educational processes while causing educational programs to evolve in order to adapt to these innovations (Januszewski & Molenda, 2013). According to the definition by the Association for Educational Communications and Technology (AECT), educational technology encompasses the deliberate use of technological tools and methods to support learning processes and enhance performance. In this context, the selection and effective use of appropriate technological tools are of great importance.

Furthermore, research frequently highlights that the use of technology in schools positively affects students' academic achievements. Such technological tools allow for the continuous monitoring and evaluation of students' developmental processes. This is because the integration of technology into education makes learning environments more interactive and student-centered, which encourages active participation in lessons and makes the learning processes more meaningful and engaging (Şendurur & Arslan, 2017; Avcu, 2024).

This mutual interaction between education and technology forms the foundation of modern educational systems and significantly transforms learning processes. The integration of technology into educational institutions facilitates students' access to information and makes learning experiences more participatory and interactive. Moreover, this integration positively impacts students' academic and personal development, increasing opportunities for personalization and adaptation in education. This situation allows students to more effectively realize their potential, aiding them in better understanding and interpreting social and cultural events. Therefore, the integration of technological advancements into educational programs should be considered an indispensable investment for the future of education, requiring continual support and innovation. This integration contributes to the educational system not only achieving academic success but also fostering a dynamic and harmonious structure that supports the holistic development of students (Altıok, Yükseltürk & Üçgül, 2017; Sahin, & Akturk, 2014).

2.1 Advantages of Technology Integration in Education

Technology integration can enable more effective, efficient, and in-depth learning across all areas of education. Key benefits provided by technology in education include enhanced research and

information access, interactive and visual learning, personalized learning experiences, collaborative learning environments, and the development of critical thinking skills. These are detailed as follows:

• **Enhanced Research and Information Access:** Technology offers students rapid access to a wide and diverse array of information resources. Digital libraries, online databases, and educational platforms increase the variety of resources used in classes (Mishra & Koehler, 2006). Students can delve deeper into course materials through historical documents, academic articles, and multimedia resources. For instance, platforms like JSTOR or Google Scholar provide access to academic articles, while historical visuals can be accessed via Wikimedia Commons.

• **Interactive and Visual Learning:** In social studies classes, visual and interactive materials greatly aid in understanding complex concepts. Interactive maps, virtual reality (VR) applications, and simulations allow students to experience historical events and geographical processes in a more concrete and comprehensible way (Çelik, 2018). For example, students can virtually explore different regions of the world using Google Earth and examine geographical features in detail. Additionally, virtual tours of ancient civilizations can be conducted using VR technology.

• **Personalized Learning Experiences:** Technology offers personalized learning experiences that allow students to progress at their own pace and style. Adaptive learning platforms analyze students' strengths and weaknesses to offer customized content (Gülbahar, 2005). In social studies, this allows students to thoroughly explore historical periods or geographical areas of interest. For instance, platforms like Khan Academy enable students to learn at their own pace and take courses tailored to their interests.

• **Collaborative Learning Environments:** Digital platforms facilitate group projects and collaborative work among students. Tools like Google Classroom, Microsoft Teams, and others enable students to share information, work on joint documents, and coordinate their projects (Johnson & Johnson, 2009). Such collaborative work enhances students' social skills and teamworking abilities. Moreover, students can exchange ideas about course topics through online discussion forums and wiki pages.

• **Development of Critical Thinking and Analytical Skills:** Technology provides tools that enhance students' critical thinking and analytical skills and increase motivational appeal. Data analysis software and digital surveys enable students to analyze social and economic data and draw conclusions (Papastergiou, 2009). This allows students to examine societal events and trends more thoroughly. For example, using data visualization tools like Tableau, students can analyze and report on economic indicators.

The advantages of technology integration enhance students' access to information, personalize learning processes, and provide opportunities for collaborative work. Through the development of critical thinking and analytical skills, students can more effectively understand and interpret societal and cultural events. This integration may emerge as a fundamental element in preparing individuals who can succeed in the digital world of the future for educational systems.

2.2. Challenges of Technology Integration in Education

The integration of technology in the field of education has the potential to transform student success and learning experiences. However, this integration process can face a series of challenges. Incorporating technology in education not only diversifies educational tools and methodologies but also necessitates the acquisition of new skills for educators and students. This section addresses the main challenges faced by technology integration in education and discusses strategies to overcome these challenges.

• **Digital Divide and Access Inequality:** Not every student may have equal access to technology. Due to economic, geographic, or social factors, some students may lack the necessary hardware and internet connection (Warschauer, 2003). This can lead to educational opportunity inequalities and a digital divide. Students from low-income families, in particular, may face difficulties with access to computers, tablets, or the internet. To address this inequality, schools need to provide device distribution programs and free internet access to ensure students have access to technology.

• **Teachers' Technological Proficiency:** Effective use of technology requires teachers to possess digital skills. However, many teachers do not receive adequate training and support (Ertmer, 1999). This can hinder the efficient integration of technology. A lack of confidence in using technology can make it difficult for teachers to integrate technological tools into their lessons. To solve this issue, ongoing professional development programs should be organized, and support should be provided to teachers on how to use technology.

• **Technical Infrastructure and Support Deficiencies:** The lack of sufficient technical infrastructure in schools can complicate technology integration. A fast internet connection, up-to-date computers, and software enable the effective operation of technological tools in social studies classes. Moreover, the inadequacy of technical support services can make it difficult to resolve encountered problems. Schools need to invest in strengthening their technological infrastructure and enhancing their technical support services (Ayaydın, 2014).

• **Student Motivation and Distraction:** Improper use of technology can lead to student distractions and lack of motivation. Excessive use of digital devices can prevent students from focusing on course materials (Yumuşak & Balcı 2018). Furthermore, distractions such as social media and games can

make it difficult for students to focus on classwork. To solve this problem, teachers should use technology in a way that aligns with lesson objectives and encourage students to avoid distractions.

- **Security and Ethical Issues:** Online safety and ethical use are significant parts of technology integration. Issues such as internet safety, protection of personal data, and cyberbullying must be carefully addressed (Livingstone, 2008). Providing students with digital citizenship education helps them to exhibit ethical behaviors online and use the internet safely. Additionally, schools need to develop and implement digital security policies.

Technology integration presents significant opportunities in the education sector; however, leveraging these opportunities may require effectively managing the encountered challenges. The use of technology in education can face a wide range of obstacles, from access inequalities and teacher proficiencies to technical infrastructure issues, student motivation, and security concerns. To overcome these challenges, policymakers and educational leaders may need to continually invest, strengthen support programs for teachers and students, and develop comprehensive strategies to make technology a natural part of the curriculum. By doing so, the benefits of technology integration can be fully realized, leading to lasting and positive changes in education.

3. Theoretical Framework of Social Studies Education and Current Approaches Under NCSS Standards

The evolution of social studies within educational history marks significant milestones in the discipline's perception and application. Initially viewed as a simplified form of the social sciences, social studies aimed to introduce students to basic concepts in a less detailed manner. Over time, it became evident that this approach did not fully leverage the potential of social studies (Doğanay & Sarı, 2003). Subsequently, social studies education was redefined as an interdisciplinary field aimed not just at knowledge transfer but at equipping students with active citizenship skills. This modern approach integrates perspectives from various social science disciplines, such as history, geography, political science, and economics, enabling students to critically evaluate societal events and issues. This shift seeks to equip students with the necessary tools to thoughtfully and critically address societal challenges they may encounter in their daily lives (Doğanay & Sarı, 2003; NCSS, 2010).

Social studies serve as an interdisciplinary field that enhances understanding of social structures, cultural values, and historical processes (National Council for the Social Studies [NCSS], 2010). Its primary goal is to foster students' analytical thinking, problem-solving abilities, and citizenship awareness. NCSS has established standards to improve the quality of social studies education, guiding teachers in lesson planning and implementation (NCSS, 2010).

The theoretical underpinnings of social studies rest on constructivist approaches. Scholars like Jean Piaget and Lev Vygotsky highlight that learning is an active, constructive process where social interactions play a crucial role (Piaget, 1973; Vygotsky, 1978). Piaget's theory of cognitive development indicates that students' progress through specific stages, each with distinct characteristics, suggesting that social studies teaching should be adapted to students' cognitive levels (Piaget, 1973).

Vygotsky's ideas on social interaction and scaffolding further propose that learning is inherently social, enhanced by engaging with more knowledgeable others. This approach promotes learning through group activities, discussions, and collaborative projects in social studies. Moreover, John Dewey's experiential learning theory, which posits that learning should connect with students' real-life experiences, also significantly enriches social studies education (Dewey, 1938). Including relatable topics in social studies classes thus helps to deepen learning retention.

The development of social studies requires a model of education designed not only to provide academic knowledge but also to encourage students to assume active and responsible roles in society. This discipline offers tools that enable students to interact with the world around them and enhances their ability to analyze social events from historical and cultural perspectives. Additionally, social studies equip students with scientific thinking skills and enable them to apply these skills in analyzing social events and phenomena (Güçlü, 2003).

In summary, the evolution of social studies aims to equip students with the skills required by a knowledge society while developing their abilities to critically assess social events, understand historical processes, and empathize within a context of cultural diversity. This indicates that social studies education adopts an interdisciplinary approach to prepare students for the challenges they will encounter in their personal and societal lives. With these characteristics, social studies is not just a citizenship education program but has become a dynamic and multifaceted course that supports students in becoming effective individuals at both individual and societal levels (Little et al., 2007).

NCSS Standards and Contemporary Approaches

The National Council for Social Studies (NCSS) advocates for a four-dimensional growth in Social Studies education: Skills, Content Knowledge, Attitudes and Values, and Active Citizenship (NCSS, 2010). These guidelines promote a holistic teaching strategy for educators.

- **Skills**: Emphasizes enhancing student skills such as critical thinking, problem-solving, research, and communication. These are essential for enabling students to effectively manage information (NCSS, 2010).

• **Content Knowledge**: Encompasses key areas of Social Studies like history, geography, economics, political science, and cultural studies. The aim is to build a robust foundation of knowledge in these subjects (NCSS, 2010).

• **Attitudes and Values**: Encourages the adoption of core principles such as democracy, fairness, human rights, and appreciation for cultural diversity. This dimension aids in nurturing students into conscientious and responsible individuals (NCSS, 2010).

• **Active Citizenship**: Focuses on developing students' abilities to engage with community issues. It motivates students to be responsive to societal challenges and to engage in proactive problem-solving (NCSS, 2010).

Today, the emphasis in Social Studies teaching is on learner-centered methods. These methods facilitate students' active involvement in their learning journeys, adapting to various learning styles (Bonwell & Eison, 1991). Such an approach fosters an environment where teachers guide and students take charge of their educational experiences, enhancing their sense of responsibility and ability to think independently. Additionally, fostering critical thinking skills improves students' capabilities to critically analyze and interpret information, allowing them to tackle complex societal issues more effectively and to devise informed solutions.

The role of technology in education holds a significant place in contemporary approaches. According to Savery (2006), the use of digital tools and online resources makes the process of acquiring knowledge more effective and interactive, enriching students' learning experiences. These tools, especially through social media and online discussion platforms, provide students with a global perspective and opportunities to interact with different cultures. Beers (2011) highlights the role of technology in enhancing students' awareness of global citizenship. This process enables students to be informed about global events and develop more sensitive and informed responses.

Moreover, the integration of technology in Social Studies classes offers students the opportunity to understand historical and geographical information more comprehensively. Tools such as digital maps and interactive simulations facilitate a better understanding of past events and geographical phenomena. These technological tools aid students by visualizing spatial and historical information, enhancing their learning experience. Online discussions on social media platforms expose students to diverse perspectives, contributing to the development of their critical thinking and effective communication skills. Such interactions also strengthen students' abilities to raise awareness about specific social issues and shape public opinion. For instance, organizing a social media campaign provides students with the opportunity to highlight societal problems and actively engage with these issues, thereby enhancing their sense of social responsibility (Elmas & Geban, 2012; Avcu, 2024).

4. Technology Integration in Social Studies Education

Among the subjects offered at the elementary level, social studies holds a unique place. This subject prepares students to understand societal, cultural, economic, and political structures and to assume active roles within these frameworks. Moreover, the aim of social studies is not only to inform individuals but also to cultivate them as aware and responsible citizens. In this context, the content of the course aims to endow students with skills such as critical thinking, effective communication, and decision-making. These skills enable students to comprehend both their individual and societal responsibilities and to fulfill them. Thus, social studies plays a critical role in developing the fundamental competencies necessary for students to take active and constructive roles in society (Akçalı & Baş, 2020; Ünlüer, 2018).

In today's rapidly advancing technological landscape, educational methods and tools must keep pace with this dynamic change. Researchers like Berson (2020) suggest that the use of technological tools in social studies education holds great potential beyond mere necessity. Online classrooms, online mapping tools, blogs, social media tools, and other digital technologies offer new opportunities and environments that enrich the social studies classroom. The use of such tools makes the classroom environment more engaging, enjoyable, and vibrant, thereby enhancing the retention of learning processes. Moreover, technological tools offer students broader perspectives for exploring and understanding social studies topics. Through these tools, students have the opportunity to examine historical events, geographical information, and socio-economic data in interactive and integrated ways. Additionally, these tools allow students to actively process information and construct their own knowledge structures. Enriching the learning process in this manner increases students' interest in and interaction with course materials, thus supporting the long-term retention of learned information (Tarman, Kılınç & Aydın, 2019).

Additionally, as a continuously changing and evolving educational discipline, social studies consistently interacts with modern concepts such as technology and digital citizenship. It is essential for education to be in sync with contemporary knowledge and technological competencies to meet the interests and expectations of the new generation of students. The inclusion of advancements in digital technologies and the emerging situations and challenges they bring into the Social Studies Curriculum is a reflection of this necessity (Yeşiltaş, 2017).

Yeşiltaş (2017) emphasizes the necessity of effectively using technology in social studies classes, which not only provides students with quick access to information but also engages them in multifaceted and interactive learning processes, enhancing their skills in critical thinking, problem-solving, and analytical evaluation. This approach shifts students from being passive recipients of information to becoming active learners and producers of knowledge. Consequently, technology-

enhanced social studies classes contribute to developing students into individuals equipped with the skills required by the information age.

In summary, enriching social studies classes with technology is emerging as a necessity of modern educational philosophy. This integration enables students to experience more effective and meaningful learning, equipping them with the skills required by the information age. For educators and policymakers, this situation entails a significant responsibility to promote and support the integration of technological tools and resources into educational processes. In this way, social studies education can more effectively fulfill its mission of nurturing students into conscious and active individuals within the complex social structures of the contemporary world.

4.1. Strategies for Successful Technology Integration in Social Studies Classes

4.1.1. Continuous Professional Development and Training Programs

Continuous training programs should be organized to develop the digital skills of social studies teachers. These programs should enable teachers to learn how to integrate technology into social studies classes and how to use new digital tools effectively. Moreover, experience sharing and mentoring programs among teachers can aid in their development in technology integration. The effectiveness of professional development programs should be supported with continuous assessment and feedback mechanisms. This process ensures that teachers derive maximum benefit from the programs and their digital skills are continually enhanced. Feedback collected at the end of the programs is crucial for understanding participants' experiences and identifying the strengths and weaknesses of the programs. This feedback should be utilized to improve the programs and better meet future training needs (Hattie, 2009; Ertmer & Ottenbreit-Leftwich, 2010).

Furthermore, the development of teachers' digital skills should be objectively measured through pre-tests and post-tests. These assessments reveal the progress in teachers' knowledge and skills levels and show how well the program's objectives are being met (Kirkpatrick & Kirkpatrick, 2006). Additionally, the extent and manner in which teachers integrate technology into their lessons should be regularly monitored. This monitoring process can be conducted through methods such as classroom observations, video analyses, and teacher diaries. These methods allow for the evaluation of teachers' actual practices in using technology, providing additional support tailored to individual needs (Danielson, 2007). Continuous monitoring and evaluation not only support the improvement of teachers in technology integration but also measure its impact on student achievement (Darling-Hammond et al., 2017).

4.1.2. Appropriate and Purposeful Technology Selection

Selecting technologies that align with the needs of the social studies classroom is critical for successful integration. The digital tools used should serve the students' learning objectives and be compatible with the course content (Mishra & Koehler, 2006). In the technology selection process, teachers should consider the specific goals of the lesson and the individual needs of the students to choose the most suitable tools. For example, employing interactive maps and timelines to better understand historical events can enhance students' spatial and chronological thinking skills. Furthermore, digital archives and online databases can deepen the social studies curriculum by enhancing students' research skills (Voogt et al., 2015; Mevlüt & Köseoğlu, 2024).

Another important factor to consider in technology selection is the ease of use and the teachers' ability to effectively operate these tools. Teachers' proficiency with technology directly impacts the successful implementation of chosen tools in the classroom (Ertmer, 1999). Therefore, ensuring that teachers receive adequate training and support facilitates the correct selection of technologies and their appropriate use for educational objectives. Additionally, the sustainability of the technology and its compatibility with the school's existing technical infrastructure should be considered (Higgins, Xiao & Katsipataki, 2012). In this regard, long-term usage and maintenance costs, as well as future updates and integration possibilities of the technology, should be evaluated.

Lastly, student feedback and the impact of technology on student achievement also play a crucial role in technology selection. Regular feedback should be collected to determine which digital tools enhance learning effectiveness, and technology choices and integrations should be continuously improved based on this data (Hattie, 2009). This approach not only maximizes the impact of technology in social studies classes but also contributes to the creation of student-centered learning environments.

4.1.3. Strong Technical Infrastructure and Support Systems

For technology integration in social studies to be successful, it is essential that schools possess a robust technical infrastructure. High-speed internet connections, modern computers, and up-to-date software are fundamental requirements that enable students and teachers to effectively use digital tools (Arat, 2011). Particularly in social studies, the quick and uninterrupted access to digital resources is critical to maintaining the flow of lessons without disruptions.

Modern computers and tablets facilitate students' use of technological tools such as interactive maps, virtual reality applications, and digital archives. These tools help students gain a deeper understanding of historical events, geographic data, and social processes while simultaneously

enhancing their digital literacy skills (Voogt et al., 2015). Current software can also enable teachers to more efficiently prepare course materials and assess student projects.

Effective technical support services ensure the uninterrupted use of technology. Technical support teams in schools quickly resolve technical issues encountered by teachers and students, ensuring that the educational process is not disrupted (Higgins, Xiao & Katsipataki, 2012). Additionally, regular maintenance and updates keep the technological infrastructure continually refreshed, allowing for the development of long-term sustainable solutions. In this context, when planning technological investments, schools need to consider not only current needs but also future requirements (Ertmer & Ottenbreit-Leftwich, 2010).

Developing sustainable technological solutions should not only focus on investments in hardware and software. It is crucial also to establish and regularly review policies that facilitate teachers' and students' access to technology. Educational administrations must continuously allocate budgets for enhancing and expanding the technological infrastructure and stay abreast of field innovations (Selwyn, 2016). Moreover, providing a robust technical infrastructure supports educational equity. Ensuring all students have equal access to high-quality technological resources can decrease the digital divide and guarantee equal learning opportunities for everyone (Warschauer, 2011). Such measures contribute to creating a more inclusive and effective learning environment in social studies classes.

4.1.4. Student-Centered and Active Learning Approaches

Technology integration in social studies should support student-centered learning approaches. In this context, projects that encourage active participation, interactive activities, and tasks focused on problem-solving should be designed. Interactive simulations and game-based learning tools used in social studies classes facilitate students' understanding of complex societal and economic processes. For example, through a simulation game, students can experience different forms of government and learn about democratic processes in a hands-on manner (Barab et al., 2013; Voogt et al., 2015). These types of technological tools not only aid in the development of critical thinking and analytical skills but also allow students to have greater control over the course content (Voogt et al., 2015).

Furthermore, using digital portfolios and online presentation tools, students can present what they have learned in creative and interactive ways. This process enables students to manage their own learning processes and have more control over learning materials (Barrett, 2015; Schunk, 2012). Teachers can better meet individual learning needs and maximize each student's potential by using such technological tools (Tomlinson, 2014). Consequently, technology integration in social studies

classes supports student-centered and active learning approaches, enhancing students' engagement with the course and making the learning processes more effective.

4.1.5. Establishing Security and Ethical Guidelines

Clear rules and policies must be established to ensure students' online safety. In this regard, digital usage policies set by schools are crucial for enabling students to use the internet responsibly and safely. Digital citizenship education should be provided to raise students' awareness of online ethical standards. These educational programs help students develop awareness of issues such as cyberbullying, privacy, copyright laws, and digital footprints (Ribble, 2015; UNESCO, 2018; Marín & Villar-Onrubia, 2022).

Furthermore, schools should develop security protocols to support students' safe online behavior. These protocols should include the use of secure passwords, two-factor authentication, and regular security updates. Educational technology administrators and teachers should play an active role in implementing these security measures and take preventive actions against potential digital threats that students may encounter (Ünal & Yıldız, 2020).

4.1.6. Establishing Assessment and Feedback Mechanisms

Continuous feedback mechanisms must be established to assess the effectiveness of technology integration. These mechanisms involve regularly analyzing students' experiences with technology use and improvements in learning outcomes (Hattie, 2009). Teachers can use various tools such as surveys, observation forms, and performance assessments to measure the impact of technology on the learning process. Additionally, digital learning analytics and student engagement data provide valuable resources for gaining a deeper understanding of technology's impact within the classroom. These assessment processes help teachers optimize their technology integration strategies and enhance student achievement (Black & Wiliam, 1998; Darling-Hammond; Yılmaz, 2023). Continuous feedback can provide the necessary data for teachers to improve their pedagogical approaches and technological applications, supporting ongoing improvement in education.

5. Examples of Technology Use in Social Studies Education

Social studies education is enriched by diversified learning methods through technology integration (Tünkler, 2021). For instance, a study by Tally and Goldenberg (2015) demonstrates how digital simulations enhance students' historical empathy and spatiotemporal understanding. These simulations allow students to evaluate historical events from various perspectives, facilitating a more in-depth learning process. Additionally, the use of technological tools reinforces students' abilities to question information and critically assess it. Bennett and Maton (2010) highlight that the use of technological tools increases students' access to information, enabling them to engage in more

comprehensive and critical thinking processes. Social media platforms and various digital tools are transforming how students analyze historical and current events, significantly affecting the dynamics of social studies classes.

For teachers, technology also provides opportunities to enrich and customize instructional materials. Hughes and Thomas (2014) document how teachers use technology to create more effective lesson plans and increase student engagement. Digital resources offer flexibility and allow teachers to adapt lesson content in ways that capture students' interest.

In light of these developments, a detailed examination of examples of technology use in social studies classes offers valuable insights into how educational strategies in this field can be optimized. The integration of technology not only boosts student achievement and engagement but also opens new pedagogical approaches for teachers. In this context, it can serve as an important reference point for future educational practices.

5.1. Use of Geographic Information Systems (GIS)

Geographic Information Systems (GIS) are powerful tools for the analysis and visualization of geographic data. In social studies classes, students can create maps, analyze spatial data, and deeply understand geographic information. For instance, students might study the population distribution of a specific region or visualize the effects of climate change. GIS tools enhance students' spatial thinking skills by enabling them to apply geographic information practically (Erdoğan, 2009; Ünal, 2012).

Geographic Information Systems (GIS) are effective tools in social studies education that assist in developing students' spatial thinking skills. As Öztürk (2020) points out, GIS technology offers students the opportunity to create maps, analyze spatial data, and thoroughly understand geographic information. This process not only helps students comprehend geographic knowledge but also allows them to apply this information in the contexts of their daily lives and global events (Görmez & Ertaş, 2019).

Furthermore, GIS tools provide students with a broader perspective on understanding and evaluating concepts of place and space. These tools, by integrating various geographic data layers, offer students the chance to explore and analyze the relationships between different phenomena. For example, mapping the relationships between economic development and environmental changes or tracking historical migration movements over time helps students understand social studies not only as a record of the past but also in the context of the present and the future (Erdoğan, 2009; Ünal, 2012).

For educators, GIS offers the opportunity to enrich and diversify course materials. Teachers can make their lessons more interactive and student-centered by using GIS tools, encouraging active student participation, and providing students with the skills to work with complex data.

5.2. Virtual Reality (VR) and Augmented Reality (AR) Applications

Virtual Reality (VR) and Augmented Reality (AR) technologies present significant innovations in the field of education, transforming how students explore historical and geographic information (Bailenson, 2018; Ünal & Şimşir, 2023). These technologies offer users the opportunity to navigate virtual environments beyond the real world, providing the chance to animate historical events and locations ranging from ancient times to the modern era. Virtual tours of ancient Roman cities conducted through VR enable students to better understand historical structures and social orders. Similarly, AR applications can virtually take students to the battlefields of periodic events such as World War II, allowing them to concretely experience the challenges and atmosphere of that period.

Augmented Reality holds substantial potential, particularly in teaching abstract concepts. For example, visualizing the effects of global warming with AR can offer students the opportunity to observe the tangible impacts of this global issue. Such interactive experiences can aid students in developing a more sensitive and informed attitude towards scientific and environmental issues.

5.3. Digital Storytelling and Multimedia Presentations

Digital storytelling enables students to prepare historical events or cultural stories in the form of multimedia presentations. This method allows students to enhance their creative skills while more effectively sharing what they have learned (Robin, 2008; Eroğlu & Okur, 2022). For example, using platforms such as Storyboard or Adobe Spark, students can create their own digital stories. This process contributes to the development of both their technological skills and narrative abilities.

5.4. Online Research and Digital Archives

Digital archives and online resources facilitate comprehensive research by students. Access to historical documents, videos, photos, and academic articles can deepen students' understanding of subjects. For example, platforms such as the Grand National Assembly of Turkey Digital Archive or European Digital Archives can offer students a broad range of resources. These resources can enhance students' research skills and enable them to make informed decisions.

5.5. Interactive Maps and Simulations

Interactive maps and simulations can enable students in social studies classes to gain a deeper understanding of historical and geographical events. Social studies education involves teaching students about multifaceted topics such as societies, environments, economies, and historical

processes. In this context, climate change simulations or interactive maps of economic crises can provide students with opportunities to observe how these complex processes operate from different perspectives.

For instance, using a climate change simulation, students can examine how various countries are affected, how geographic features change, and the social and economic consequences of natural disasters throughout historical periods. Similarly, an interactive map showing migration routes allows students to study historical migration movements and their impacts on societies. Such a map can help students analyze the role of geographic and economic factors in migration decisions.

Additionally, interactive maps of historical battles can enable students to see where specific battles occurred, how armies moved, and the impact of these wars on political boundaries. This can assist students in assessing the strategic aspects of past wars and the significance of geography in the outcomes of those conflicts. Another example includes interactive maps showing the effects of natural disasters, which can allow students to visualize the societal and economic impacts of earthquakes, floods, or volcanic eruptions. Students can gain awareness of disaster management and the role of nature in the selection of human settlements through these maps.

Such interactive tools can enhance students' skills in data analysis and in establishing connections between historical and social events. This facilitates students not merely receiving information passively but actively processing and interpreting it. Consequently, students can strengthen their analytical thinking and problem-solving abilities.

5.6. Social Media and Digital Platforms

Social media and digital platforms facilitate students' engagement with current societal events, promote idea exchanges, and enhance active participation in their learning processes. Platforms such as Twitter, Facebook, and Instagram can be used to provide students with timely information on social events and spark discussions. Additionally, through blogging and digital portfolios, students can share their learnings and receive feedback. These practices not only improve students' digital literacy but also expand their social interactions (Avcu, 2024).

The integration of technology in social studies education offers substantial benefits by making information more accessible, enriching learning processes, and enabling personalized educational experiences. Tools such as Geographic Information Systems, Virtual and Augmented Reality applications, digital storytelling, online research and digital archives, interactive maps and simulations, along with social media and digital platforms, significantly increase the efficacy of social studies classes. Educators' effective utilization of these technologies can enhance students' academic performance and equip them with the necessary skills for the modern world.

6. Conclusion

Technology integration in social studies education emerges not merely as a tool but as an effective factor in transforming learning processes. The strategic and conscious use of technology offers deeper and more lasting learning experiences by not only facilitating students' access to information but also enhancing their critical thinking, problem-solving, and collaboration skills.

Particularly in disciplines like social studies, abstract concepts can be challenging for students to understand. At this point, technology steps in to make abstract concepts more concrete and visualized. For example, digital maps, simulations, or virtual reality applications can make historical and geographical events almost "lived experiences," allowing students to approach the subject with a deeper understanding. Students' ability to collect data with the help of technology, analyze this data, and establish relationships among them can strengthen not only their academic achievements but also their critical thinking and problem-solving skills. Technological tools such as Geographic Information Systems (GIS), virtual and augmented reality applications, digital storytelling, and interactive maps can enable students to better understand complex social phenomena. Through these tools, students not only read about historical and geographical events but also learn by experiencing them.

However, several important steps need to be taken for successful technology integration. Enhancing teachers' digital competencies, providing a strong technical infrastructure, and adopting student-centered learning approaches are the cornerstones of this process. Additionally, guidelines established on digital security and ethical issues ensure that students use technology responsibly.

Finally, technology integration emerges as a transformative tool in social studies education. This integration not only enhances students' academic achievements but also prepares them to take their place as active and conscious citizens in the digital world of the future. It may be important for educators, policymakers, and all stakeholders to support this process for the success of future education systems and the overall well-being of society.

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Chapter 7 – E-Book Technology: A Guide for Social Studies

Seval AKCAN

Chapter Highlights

- Understanding e-book technology and its features, as well as its place and importance in social studies.
- Exploring the impact of interactive content on learning in social studies education.
- Creating interactive, accessible learning environments with e-books.
- Discovering the advantages and disadvantages of e-books.

1. Introduction

Digital transformation is causing fundamental changes in the world of education, just as in many other fields. These innovative tools, which are effective and contribute to the learning processes of both teachers and students, are diversifying more each day. E-books, one of the most important elements of this transformation, provide great ease in accessing information. In addition, teaching materials are also becoming more enriched. Thanks to all the possibilities offered by e-book technology in the field of social studies, students can better understand the abstract concepts found in the content of history, geography, citizenship, and cultural knowledge. Their visual richness and variety also contribute to making these topics more concrete.

Today, alongside printed books, e-books that we can access digitally are also widely used. E-books can be read on computers, tablets, smartphones, various e-book readers (such as Kindle), and other digital devices. E-books, which provide numerous advantages to their readers, offer many benefits in various aspects. For example, while printed books have the inconvenience of being physically carried, e-books do not face this issue since they have no physical form. E-books are organized in various file formats such as PDF, EPUB, and MOBI (Soydan, 2011).

This section will address the definition and history of e-books, their role in social studies education, their advantages, methods of use in social studies classes, disadvantages, and the future of e-books. It will focus on the effects of e-books in enhancing students' interest and motivation, the role of interactive content in supporting learning processes, how teachers can utilize this technology, and how to prepare engaging lessons for students.

This section aims to enhance educators' knowledge on technology integration. It also aims to contribute to creating a more effective learning environment that aligns with the learning objectives of social studies courses. While exploring the opportunities provided by e-books, this section offers essential information and tips for social studies teaching that meets the needs of the digital age, making digital information more accessible and convenient for both students and educators.

2. E- Definition and History of E-Books

In addition to printed books, electronic books in digital format are widely preferred by people. E-books, which have developed in line with advancements in digital technology, began to be used with the increase in computer usage and the development of digital storage spaces. UNESCO has defined a book in Britannica as “a non-periodical publication consisting of at least 49 pages, excluding the covers” (Encyclopedia Britannica, 2015). Based on this definition, Önder & Atılgan (2010) have defined e-books as electronic elements that possess these characteristics and, in addition to these, incorporate new technological features, providing various advantages to users. Hawkins

(2000) defines electronic books (e-books) as the presentation of commonly used printed book content in electronic format. Morgan (1999), on the other hand, describes e-books as a software-hardware combination used to read electronic data on specially designed and portable devices. Haşıloğlu (2007) categorizes digital products into three groups: multimedia products, software, and electronic texts. He states that e-books fall into the category of digital texts.

Soydan (2011) describes e-books as either a digital copy of a printed book or books created with content written in an electronic format. Rao (2003) refers to electronic books as texts that have transitioned to digital format from word, image, and shape files on a computer. E-books differ from traditional books because they possess features such as sound, animated visuals, and multimedia effects (Anderson-Inman & Horney, 2007). These aspects provide them with numerous advantages.

The use of digital platforms for "reading" purposes began in 1971 with the Gutenberg Project initiated by the American author Michael S. Hart (Dündar, 2011; Ebook, 2002). Through this project, classic works were digitized and made freely available to the public. The United States Declaration of Independence became the first e-book of this project Although digital texts began to be used in the 1960s, only scientific articles and technical documents were transferred to computers. These articles and documents were generally not made public and were used mainly in military and academic fields (Lebert, 2009).

With the Gutenberg Project, the first e-books began to be used. Tim Berners-Lee invented the Web, and in 1993, he released the first browser, Mosaic, which led to the widespread use of the internet. In 1992, the Runeberg Project was initiated by the Swedes, and in 1994, the Germans launched the Gutenberg-DE Project. These efforts further promoted online librarianship (Lebert, 2009).

In the 1980s, e-books were shared via floppy disks and CD-ROMs. Through this method, many publishers and authors created digital books and made them accessible to the public. In the 1990s, with the widespread use of the internet, accessing e-books became easier. Authors and publishers reached people with digital books via email and websites. As the distribution of e-books became easier and demand grew, commercial e-book sites were established. In 1987, as part of the Gutenberg Project, the computer game company Eastgate Systems published Michael Joyce's book "Afternoon" by saving it on a floppy disk. Additionally, in 1990, Serendipity Systems developed a program called "PC-Book" to view and use e-books (Ebook, 2002).

In the 1990s, electronic journals also began to be used. These journals, available in PDF format, were prepared utilizing multimedia tools. Embedded links related to the topic were also included within the text. By the late 1990s, e-books became more significant for both librarians and publishers (Zivkovic, 2008). In 1993, the PDF format, which standardized the page layout and text appearance

of e-books, began to be used. This format was developed by Adobe. Additionally, in 1993, a device known as "DynaBook," regarded as one of the first modern tablets, was produced, enabling the creation of portable e-books. In 1995, Amazon and in 1997, Barnes & Noble began selling books online. In 1998, e-libraries started to be used. In 2001, the Acrobat eBook Reader was released, and books in PDF format were utilized (Lebert, 2009).

The first e-book reader devices were introduced in 1998, known as Rocket eBook and SoftBook. Due to their limited memory capacity and high costs, these devices did not reach a wide audience (Jones, W., 2000). In 2007, the Kindle e-book reader device was launched, featuring wireless access. It is known that this device was first introduced and sold through Amazon (Weinberg, 2010). Another development related to e-books was the adoption of the EPUB format (O'Reilly, T., 2009). The PDF and EPUB formats have become significant.

After 2010, tablet computers began to be widely used, allowing e-books to be accessed on portable (mobile) devices. Following Apple's launch of the iPad, the usage and availability of e-books increased thanks to applications like Apple Books and similar platforms (Soydan, 2011). Additionally, platforms such as Scribd and Audible made e-books more popular. Today, with the rapid advancement of technology, audiobooks, enriched content e-books, interactive elements, and e-book platforms are being developed.

Electronic books can be accessed through computers, mobile phones, tablets, and e-book reader devices, as well as via iOS and Android operating systems. E-books are sold on virtual platforms such as the App Store and Google Play Store, which are compatible with these systems (Zor & Yüksel Kirişcan, 2016).

When examining the use of e-book applications in the Turkish Education System, it is necessary to mention the project called the Fatih Project, which supports information technologies. This project aimed to provide equal opportunities in education (Ekici & Yılmaz, 2013). In 2016, within the scope of the Fatih Project, the Ministry of National Education (MNE) created an online social network platform called the Education Informatics Network (EBA). EBA continues to be used today and contributed to distance education during the COVID-19 pandemic.

Some of the e-book software used today are as follows:

- **Glassbook Reader**: A colorful software that allows viewing in HTML and PDF formats and offers free usage. It was purchased and developed by Adobe in 2001 (Day, 2001). This software is limited in terms of the types of works it supports (Burk, 2000).
- **Adobe Acrobat eBook Reader:** Allows the reading of PDF (Portable Document Format) files. It

provides the ability to display on LCD screens through CoolType technology, offering high-resolution visuals. Through this software, e-book files can be downloaded using the internet, and personal libraries can be created. Books readable with this software can be downloaded from websites such as Glassbook Bookstore, Adobe eBook Store, Amazon.com, and Barnes & Noble.com (E-kitap: teknoloji, 2002). Adobe Digital Editions enables reading books in ePub and PDF formats and supports DRM-protected content.

• **Microsoft Reader**: Can be used on desktop and laptop computers as well as handheld devices. It can be downloaded for free from the internet. It is clearly readable on ClearType LCD screens (Hawkins, 2000). It offers advantages such as bookmarking pages, adding notes and drawings, using a dictionary, and displaying the selected page.

• **Librius**: Can also be used on Palm OS and Microsoft CE computers for reading e-texts. The software capacity is limited and reduced to 45 works. Its use is restricted, and it has ceased e-book reader device production. It provides software compatible with platforms like Mac OS, Linux, MS Windows/X, and EPOC/Symbian (Burk, 2000).

• **Amazon Kindle:** This application and device are highly preferred for reading e-books. It offers features such as highlighting, note-taking, and accessing definitions of words. It has a vast e-book library.

• **Apple Books:** Available on devices like iOS and macOS. Individuals using these devices can purchase and read e-books and audiobooks. It offers features such as note-taking and highlighting**.**

• **Google Play Books:** Commonly used on Android devices. It offers e-book and audiobook options and allows offline access to books.

• **Kobo:** Users of this application can access a vast library and have the ability to take notes and highlight text. This app has a social media connection, allowing users to share content.

• **Calibre:** Compatible with many devices due to its format conversion feature. This allows e-books to be read and edited in different formats on various devices. It is easily accessible due to being open-source and free software.

• **Scribd**: A software for accessing e-books, audiobooks, and articles, used for research and accessing diverse and comprehensive information. Using this software requires a subscription.

• **FBReader**: Allows reading by supporting various e-book formats. It offers theme options and enables synchronized use of e-books across different devicesThe main hardware used for reading e-books (e-book reading devices): Rocket eBook Reader, SoftBook Reader, Librie produced by Sony, EB Dedicated Reader, eBookMan EBM-900/901/911, EB Dedicated Reader, and other Pocket PC

and Palm OS devices (Anameriç & Rukancı, 2003; Zor & Yüksel Kirişcan, 2016). Formats such as Amazon Kindle (.azw), Open eBook (.opf), Palm Media (.pdb), PDF (.pdf), EPUB (.epub), Newton eBook (.pkg), PostScript, etc., are also used (Çölkesen, 2011; Kalburan, 2014).

Soydan (2011) states that e-book software provides significant advantages for both authors and readers. These advantages include not only supporting the topics in the book with text but also with visual and auditory elements like sound, music, and images. Other advantages of e-books include taking notes, bookmarking specific sections, quickly and easily finding desired pages or information through search rather than flipping through pages, and conducting quick research on any word or concept in the book via the internet (Soydan, 2011).

3. Advantages of E-Books for Social Studies Education and Other Areas of Use

Today, as in all subjects, the use of e-books in Social Studies courses has increased. E-books offer many advantages, providing great convenience to students and teachers. One of these advantages is the ease of accessibility to e-books. Users can access these books anytime and anywhere they want. Nattar & Selvakumar (2009) describe the most important advantage of e-books as "ubiquity." Additionally, while printed books cannot be updated until a new edition is released, e-books can be updated as needed, allowing readers to access the latest information more quickly. Another advantage of e-books is the ease of interaction through multimedia elements (videos, quizzes, interactive maps, interactive multimedia, animations, etc.). With these features, they offer visual and auditory support to users and students. For example, when studying the rapid geographical expansion of the Ottoman Empire, it may be necessary to use maps, voiceovers explaining the information on the map, animations, and videos from historical documentaries. E-books developed today provide these resources, enabling students to learn topics more effectively and permanently.

E-books provide students and other users with interactive activities, enabling students to participate actively in lessons. For example, when discussing the topic of "Violations of Our Fundamental Rights and Freedoms," they offer quizzes, discussion environments, and platforms for real-time feedback, allowing students to brainstorm. This enables students to discuss the topic, test their knowledge, and identify any gaps in their understanding and achievements.

Since e-books can be easily transported from one place to another, it becomes easier for students to access study materials from different locations. For example, during an off-campus study, at a museum, or an exhibition, students can easily access information with their tablet computers or phones.

The fact that the information in e-books is on a digital platform makes it easier to modify and update this information. With this feature, they are more easily updated than printed books and do not lead

to paper waste. E-books contribute to environmental protection by reducing paper consumption. Additionally, they save the producer from the costs required for printing. The fact that e-books are sold at more affordable prices compared to printed books makes it easier for them to reach more readers (Zor & Yüksel Kirişcan, 2016). Moreover, there may be students in educational programs who need to read certain subjects and outcomes but struggle with reading. These students can overcome this issue by using interactive electronic texts instead of printed materials they find difficult to read (Anderson-Inman & Horney, 2007).

E-books support the improvement of students' academic success by providing easier access to information, which allows them to study more effectively. They also promote the development of students' critical thinking skills. Each student's learning needs are different. E-books, which offer personalization options based on interests, needs, and learning speeds, make learning easier and better cater to individual student characteristics. For example, for a student with learning difficulties, they allow customization of font size, font style, and background color. Additionally, they contribute to making learning enjoyable for students.

Another advantage of e-books is that they offer the possibility of use outside the classroom and beyond class hours. Students can carry all their books digitally even during activities outside school. For Social Studies, they can bring their e-books along on field trips, activities, and museum visits. This way, they can reinforce the information they've learned or explore new information with the data available in e-books. They are diverse in content and resources. Additionally, e-books can be used offline without an internet connection. It is sufficient for students to download the content once when they have internet access. Moreover, while the content in printed books cannot be updated until a new edition is published, e-books can be easily updated. Changes in the curriculum or the addition of current events to textbooks can be addressed easily. Since e-books exist in digital formats, they save paper and are eco-friendly resources (Zor & Yüksel Kirişcan, 2016).

E-books can also be used in audio format. With this feature, e-books provide reading and learning opportunities for visually impaired readers (Önder, 2010). Additionally, these audio and interactive e-books not only facilitate learning but also contribute to students' identity development, as well as their physical, social, and emotional growth (Gökçeaslan, 2009).

Thanks to internet connectivity, while using e-books, we have the opportunity to research any question that comes to mind. Additionally, hyperlinks, email, or contact forms within the content help readers communicate with the author (Önder & Atılgan, 2010).

With these advantages, e-books enhance students' independent learning skills as well as abilities like critical thinking, analysis, and research in Social Studies classes. The flexibility and accessibility

offered as digital educational materials make Social Studies classes more effective and engaging, positively contributing to student success.

4. Methods of Using E-Books in Social Studies Classes

As in many fields, e-books are also used in education and have become essential study resources in various disciplines. Social Studies is one of these disciplines. E-books that are prepared in line with course content and curricula are utilized as educational materials. Additionally, students can use these books not only in the classroom during lesson hours but also anytime they wish to study, conduct research, and access the necessary information. E-books can also be beneficial for group work. Moreover, through e-books, various projects can be carried out, supporting project-based learning.

Specialized e-books prepared as instructional materials for Social Studies have provided significant advantages to students. E-books designed according to Social Studies topics facilitate learning. Students can study, conduct research, and participate in activities through e-books at home or any place they prefer. Group work in Social Studies classes enables active student participation in lessons. E-books can be effectively used in group work and projects in the classroom. Through these activities, students can develop skills such as problem-solving, critical thinking, and research. For a better understanding of topics in Social Studies, learning environments should be supported with maps, visuals, multimedia elements, animations, and interactive content. E-books offer substantial possibilities for this purpose, thereby increasing students' interest and motivation in the subjects, enabling them to learn better through active participation.

Field trips are highly important in Social Studies classes; however, factors such as lack of time, difficulties in obtaining necessary permissions, and the distance of the destination often prevent school trips from taking place (Akcan, 2010). When the content of e-books prepared for Social Studies is designed in alignment with the lesson, it ensures that lessons are conducted effectively and efficiently. Interactive lesson activities added to e-books facilitate learning.

Social studies is a course in which students establish a connection between events and phenomena. For this connection to be established, students need to internalize abstract topics by making them concrete. Activities that allow students to take an active role in the lesson, along with interactive course materials, make learning easier. When students gather information from printed books, these topics may seem boring, and they may struggle to study. Interactive e-books, however, make it easier for students to learn without getting bored. Video, animation, and other multimedia links embedded in e-books can make the information being read more engaging and concrete.

Field trips can also be organized as part of social studies classes. While these trips are taking place,

students can carry their e-books with them and use multiple books in different environments with the help of a single device. Additionally, there are school trips that cannot be organized due to various reasons. For example, museum visits are very important for social studies, but these trips may not happen due to the distance of the location, lack of necessary permissions, etc. In such cases, virtual museums can be utilized. Links to these virtual museums can be embedded in e-books containing social studies content, allowing students to take virtual museum tours by clicking on the links while reading the information in the books. If questions that students can answer after the museum tour are also included in the same book, it will encourage them to tour the museum more attentively. Moreover, e-books designed with augmented reality applications that allow students to view figures compatible with history and geography topics will not only be engaging but also serve as interactive learning materials that enable students to learn actively.

he project titled 'Footprints of Kayı,' prepared for the 2023 TÜBİTAK Middle School Projects Competition, is a virtual museum project. Photographs of artifacts in the Living City Museum located in Bilecik province were taken, and a virtual museum was designed using the Spatial.io application. This museum has not only remained a virtual museum but has also been integrated with VR goggles, offering students a different experience. Students could tour the museum through devices like computers, tablets, phones, and smart boards, as well as through VR goggles. A 'Museum Escape' game was also prepared for students visiting the museum. To complete this game and exit the museum, students must answer questions correctly about the artifacts they saw in the museum (Akcan, 2024). Such applications and methods, which provide an interactive learning environment and enable students to learn while having fun, should be utilized more. When e-books are designed with virtual museum links, VR-compatible or augmented reality links, and other technology-based activities as in the TÜBİTAK Project, learning will become faster and easier. Additionally, they will attract more attention and preference as they will arouse curiosity and interest in readers.

All these innovations that can be made in e-books will also contribute to students' distance education processes. The Education Informatics Network (EBA), supported by the Ministry of National Education, also facilitates distance education. The Distance Education Center (UZEM) was established not only to support the education of students but also of teachers, and distance learning platforms gained significant importance during the Covid-19 pandemic (Naci, 2022). Course materials that support distance learning are essential both for potential pandemic periods and similar situations, as well as for providing students with flexible learning opportunities. E-books also meet this need. Well-designed e-books can cater to the diverse interests and needs of readers.

5. Disadvantages and Challenges of E-Books

E-books have disadvantages as well as advantages. Like other applications that require internet usage, e-books also need an internet connection. In cases where users cannot access the internet or other technological tools (computer, tablet, phone, etc.), they cannot benefit from these books (Soydan, 2012). This can lead to inequality in education. Excessive screen time from using these books is another disadvantage (Zor & Yüksel Kirişcan, 2016), which may cause digital fatigue for users. Nowadays, many e-books are published, and some of these may lack sufficient information and content. In such cases, these books are identified as low-quality and inadequate, leaving people without enough information. Additionally, since e-books are read on screens, users may experience issues such as eye strain and headaches (Önder & Atılgan, 2010).

Another challenge of e-books is that, since they are created digitally, they are also sold in virtual environments. People may experience difficulties when purchasing books from online stores. Some people also struggle with downloading the books they have purchased (Soydan, 2011). E-books can be produced in various formats, which means there is no standard. Therefore, the formats in which e-books are published vary, as they need to be prepared in formats compatible with the devices on which they will be used (Bozkurt & Bozkaya, 2015; Önder & Atılgan, 2010; Gökçearslan, 2009; Anameriç & Rukancı, 2003). If e-books are not designed in the correct format, their display quality may deteriorate (Akay, 2012).

In order for e-books to be sold and used, copyright protection is necessary. Otherwise, e-books may face issues with piracy, similar to those in music and cinema (Önder, 2010).

6. The Future of E-Books and Innovative Areas of Use

Throughout history, people have used various tools to communicate with each other and express themselves. These tools have included stone, clay tablets, papyrus, and paper, in that order. With the rapid development of technology, needs have been met through the use of keyboards and screens (Soydan, 2011). Accordingly, emails and text messages have replaced letters.

E-books are quickly adapting to current technology and keeping up with advancements. The fact that e-books are becoming interactive, containing multimedia content, and being enhanced with sensors and cameras indicates that they will reach even higher levels in the future. E-books are being prepared not only as plain text but in a way that allows individuals to participate interactively in activities and encounter various visuals, videos, and animations. Today, technological developments such as artificial intelligence and augmented reality have also led to changes in e-books, and they have begun to be published with integration of these technologies (Bozkurt & Bozkaya, 2013). With all these features, when e-books are used as educational materials, they will create more engaging learning

environments for students, making it easier to learn topics. Students will be able to learn in a more interactive environment.

Thanks to artificial intelligence, e-book platforms can offer users book recommendations tailored to their preferences and reading habits. Additionally, the e-books used are being linked with social platforms where readers can share their comments and notes, communicate with the author, or participate in discussions (BBC, n.d.).

Unlike printed materials, e-books are considered environmentally friendly because they reduce paper usage. Cloud-based applications like Google Drive, iCloud, Dropbox, and OneDrive allow for the storage of files, easy sharing with others, and updating by making edits. This can simplify students' lives in education. For example, a teacher can instantly provide feedback, edit an assignment, and share new information with a student who shares their work via Google Classroom.

E-books can play an important role in enabling instant translation and facilitating language learning. The integration of e-books with digital dictionaries, resources that provide grammar explanations, and applications makes users' lives easier.

7. Conclusion

The development of the digital age continues to renew and enhance the opportunities it offers. These innovations and advancements open new advantages and doors to educational environments. As in the teaching of many subjects, e-book technology, which is also effective in Social Studies courses, has become a powerful educational tool widely used in learning environments. E-books, which hold an important place in the field of education, offer significant advantages in reading, carrying, and researching scientific and academic publications (Önder & Atılgan, 2010).

This section shares information on the multifaceted learning opportunities that e-books offer to students and readers. E-books play an active role in making Social Studies courses more engaging, accessible, and comprehensible. Supported by rich materials such as visuals, interactive tools, and videos, e-books help students better understand the course topics and develop their critical thinking skills. They also contribute to the improvement of students' digital literacy skills.

The effective use of e-book technology across various fields greatly enhances access to information. This technology fosters student-centered learning in educational environments and actively engages students in their lessons. E-books play a crucial role in enriching lesson content for teachers. They enable the customization of learning environments and address the individual learning needs of students. Just as with other subjects, e-books offer flexibility for teachers in planning lessons and organizing learning spaces, particularly in Social Studies courses. Additionally, by personalizing the learning process, they make it easier for students to grasp new material. Throughout this process,

teachers ensure that e-books are aligned with pedagogical objective. In conclusion, e-books continue to play an important role in the past, present, and future of Social Studies education. The use of e-books by educators in alignment with pedagogical objectives will make social studies courses more active, dynamic, and engaging. It will also encourage students to actively participate in lessons. This guide, used in accordance with the needs of the digital age, significantly contributes to lifelong learning processes in social studies education. It is also observed that it supports students in developing different perspectives in problem-solving or evaluating events, as well as in enhancing their problem-solving and critical thinking skills.

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PART III- BUILDING THE 4CS THROUGH TECHNOLOGY: SAMPLE ACTIVITY FOR SOCIAL STUDIES

Chapter 8 – Creativity and Innovation

Ali MEYDAN

Güven KEMERKAYA

Chapter Highlights

- Creativity and innovation in terms of 21st century skills
- Creativity and innovation in education
- A sample creativity and innovation skills activity for social studies classes

1. Introduction

1.1. Creativity and Innovation

The 21st century development and the rapid advancement of technology accordingly affect human life in different ways. The rapid change experienced in the world has differentiated the need for human resources in many areas such as economy, education, industry and health. In societies, there is an expectation from educational institutions and professional organisations to train people who can meet the needs of the century. The concepts of creativity and innovation have been the concepts that come into play at this point. The 21st century demands individuals who can meet the expectations of society, who can question, think critically and produce fast and effective solutions to new problems brought by the century. Creativity and innovation are concepts that are constantly on the agenda today as key skills for career and life success (Plucker, 2022: 1). Although the concepts of creativity and innovation have been evaluated from different perspectives, the definitions of these concepts basically focus on the same point.

Basically, innovation is defined as 'innovation' or the creation of something new. Creativity, on the other hand, precedes innovation as an action and prepares the ground for innovation. Creativity and innovation are generally used together because they are intertwined. In human history, creativity and innovation have guided the progress of civilisation (Lee et al., 2023: 51). Creativity provides individuals with the skills and tools they need to respond effectively to the changes occurring in their environment, to make them work on their behalf and to be active participants in order to improve their quality of life. Creativity enables individuals to utilise the novelty of change and shape or direct it in constructive, valuable ways (Treffinger et al., 2013: 45). Creativity refers to new thoughts and original ideas. Innovation is the realisation of original and new ideas reflected in new products, processes and applications (Mann, 2011: 241).

Creativity and innovation are confused with each other. Without creativity, there can be no innovation. In a basic sense, creativity is the ability to think of something new. Innovation means carrying out creative ideas or implementing something new (Alleem, 2020: 52). Creativity is part of innovation, offering new ideas. Innovation is the part that turns these ideas into action. In other words, creativity is the first step towards solving a problem. At this stage, the individual realises the problem and starts to look for solutions. Innovation is concerned with putting the found solution into action (Shah, 2024:4). Since the concepts of creativity and innovation are often used together, they cause concept confusion in teaching. It should be frequently emphasised to students that the idea of creativity is the driving force that activates the act of innovation.

Creativity sometimes requires breaking the rules, changing perspectives and seeing differently. This can create a tense environment between the person who develops the new way of seeing and the rest of the society with a fixed view (Goller & Bessant, 2024: 7). Creativity is at the starting point and at the centre of every innovation. Innovation is the way in which a creative result is expressed in a larger context. Creativity is a process beyond having raw ideas. Creativity should not be perceived as a sudden realisation. Therefore, creativity is a process that can be systematically guided (Rustler, 2017: 18). In order for creativity to emerge, a need or a problem must trigger this situation, and in some cases it can emerge without any external influence. It is known that in many of the discoveries made in various periods of history, thousands of trials and attempts made by scientists were fruitless, but when they changed their point of view and managed to see differently, they reached the result.

Creativity is one of the research topics that social sciences are interested in. Creativity issues have a long history, especially in philosophy and psychology. In this context, since 'being creative' is an increasingly desirable skill, it attracts the attention of scientists working in different fields. Creativity is recognised as a characteristic of individuals who will carry out the professions of the future. For this reason, creativity should be instilled in students and included in curricula. In this respect, creativity and innovation are intertwined with the process of creating new and powerful ideas (Goorha & Potts, 2019: 90). Creativity and innovation skills are necessary skills that individuals should acquire in the content of 21st century skills. It is thought that individuals who have acquired creativity and innovation skills will shape the society of the future and will undertake an important task for a sustainable social structure.

1.2. Foundations of Creativity and Innovation

The basis of creativity and innovation is as old as human history. In every period of history, people have needed to meet their basic needs such as shelter, protection and nutrition. They have encountered different problems during these processes. They had to produce something new to solve the problems they faced. As society has changed, needs, interests and problems have also changed. This situation has led people to new searches. Thus, people used their creativity and made new inventions and discoveries.

The concepts of creativity and innovation have historically emerged from arts and crafts that were thought to advance social justice and social good. Creativity has gained value in the creation of works of art because it challenges consciousness and has the potential to expand (Barr et al., 2022: 348). How did creativity come about? The question is like asking how long a piece of string is. Creativity started with the existence of humanity. Creativity takes on a flexible structure when paired with art. However, while it is defined as finding a practical way of doing something, it turns into a solution-oriented product. In every period of history, there have been people who have the characteristic of

creativity. Examples include Archimedes' leap of imagination in the bathtub, the combination of space and weight that characterised the craft of medieval stonemasons, or the eclectic skills of Leonardo da Vinci. In history, creativity was considered a gift until the 1900s. It was considered as an innate talent, not something that could be taught or developed (Clegg, 1999 :8).

The process of researching creativity as a scientific disciplinary approach began in the 1950s as a sub-discipline of psychology. The first work in this direction started after J. P. Guilford's conference on 'The Structure of Intelligence' in 1949. In his conferences, Guilford argued that creativity is a resource at everyone's disposal and that everyone should use this resource to make a great contribution to society (Rustler, 2017:15). Creativity and innovation are very important for the development of individuals and societies. In order for individuals to gain creativity and innovation, education systems should be designed in this direction.

1.3. Creativity and Innovation in Terms of 21st Century Skills

In order for societies to survive, they need to integrate the citizens of the future into an education system suitable for the age. For this reason, the existence of competent individuals who have acquired the skills to overcome the responsibilities of the 21st century is of vital importance for societies. The 21st century is an age characterised by rapid, instantaneous changes. This situation brings with it problems that are difficult to overcome. In order to solve the problems, society needs to raise its members equipped with competences appropriate to the age.

The 21st century innovations in information technology require individuals to have a high level of creativity and discovery skills as well as the ability to apply new knowledge in science and technology to modern products. It requires individuals who have acquired creative skills to be able to look at their environment from different perspectives. The ability to explore is the locomotive of creative imagination (Gıeras, 2019:1). Among 21 century skills, creativity and innovation skills are also important in terms of raising individuals with the qualities desired by the society.

The 21st century global economy requires constantly inventing new and better products for the global market place. This necessitates greater imagination, creativity and innovation. Therefore, creativity and innovation, the third skill of the 21st century, focuses on discovery and invention. Creativity and innovation are at the centre of the need for self-sufficient, lifelong learners (Trilling & Fadel, 2009:49). As the development of technology has increased production, it has also changed the balance of consumption at the same rate. The speed of consumption causes the products accepted as new to become outdated in a short time. Technology that does not renew itself in the field of production disappears in a short time as it will lose its power to compete with other fields after a while. In this context, it is known that needs and problems are increasing rapidly as a requirement of

the age. Since this rapid growth requires rapid thinking and solution generation, societies need creativity and renewal more than ever.

1.4. Development of Creativity and Innovation

The development of creativity and innovation is a process influenced by environmental factors as well as personal characteristics. The development of creativity and innovation characteristics of individuals is possible with a conscious support. Supporting individuals and designing learning environments according to this situation will enable them to find innovative solutions throughout life.

The development and change in the world is experiencing the fastest period in history. Societies have to develop a new paradigm of human capacity to ensure the continuation of human existence in the future. There is a need to nurture human talent and to develop an understanding that talent needs to be expressed differently in each individual. Individuals need to grow creatively and be inspired in their environments (Robinson & Aronica, 2009:13). Change is a common experience for every individual. This process continues to increase gradually throughout life. Enabling students to acquire creativity skills enables them to cope with changing situations and to adapt to the world conditions that will change at a rapid pace in the future (Treffinger et al., 2013:44). Experiences, ideas and interacting with people expose individuals to different and perhaps ambiguous information. This provides resources to explore the reasons for the formation of new behaviours and situations in individuals. These behaviours prepare the ground for an environment that supports the creative process (Bieraugel & Neill, 2017: 36).

There is a general tendency in society to assume that creativity and innovation are innate. However, scientific studies argue that individuals can be more creative and innovative when given the right environment and opportunities (Wagner, 2012: 37). The development of creativity and innovation can be achieved by using the right environment, the right time and the right method. If the individual is motivated and exposed to encouraging guidance in the society, school or peer groups, the path to creativity and innovation can be paved.

1.5. Teaching Creativity and Innovation

Although creativity and innovation are innate characteristics of individuals, intervention may be needed for the development and emergence of creativity and innovation. The environment in which individuals live, the education and support they receive can enable the creativity and innovation characteristics inherent in their genetic code to shine.

Personal development is a process that continues from the womb to advanced ages. This process calls on formal and non-formal education systems and different organisations to not only support

behavioural change through learning and to transfer the necessary knowledge, but also to support learners to be active in designing their own learning activities. Students need to acquire the skills and competences to work on their own for sustainable change and transformation (Lambropoulos & Romero, 2015:45).

Creativity and innovation are key skills that should be included in curricula. These skills are necessary to prepare students for a workforce that increasingly expects problem-solving competence based on creativity and innovation-oriented performance (Alshammari & Thomran, 2023: 132). There is a long-standing question as to whether creativity and innovation should be taught directly or indirectly. As with many issues, it is not possible to make a judgement that one point of view is absolutely right and the other wrong. Both ways can be applied. The challenge here is to understand what is right and what is wrong (Adams &Hamm, 2013: vi).

From primary to secondary school or higher education or in the workforce, creativity and innovation emerge from the sociocultural interactions of individuals with their environment. Positive interaction of individuals can support the development of creative self-beliefs and motivate individuals to engage in the creative process. This could lead to a comprehensive assessment system focussing on creative talent and innovation potential. When children transition from adolescence to adulthood, they naturally change in the areas in which they are active and interested. The sociocultural status of individuals and their individual development are two intertwined elements. Both elements play an active role in determining the way of expressing creative ability and innovation potential (Plucker et al., 2023:35).

The teaching of creativity and innovation should be of a nature to reveal the creativity potential of individuals. In teaching creativity and innovation, individuals should be provided with trainings that support strategy approaches such as project-based learning, inquisitive learning and critical thinking. Creating learning environments where individuals can express themselves comfortably and developing teaching materials will contribute to the teaching of creativity and innovation process. In the process of creativity and innovation, the student should be at the centre of learning. The teacher should be a guide in the teaching and learning process.

1.6. Creativity and Innovation Barriers

There may be both individual and organisational barriers to the development of creativity and innovation. Fear of risk-taking and failure due to the environment in which individuals grow up can stop the creative tendency. The need of individuals not to go out of their daily routines and not leaving their comfort zone can be considered as obstacles to creativity and innovation.

As a requirement of the 21st century, educational institutions are encouraged to nurture creativity. In addition, universities are invited to become centres of creativity and innovation. Universities want to educate their students as graduates who are equipped with the qualifications to face the challenges of the 21st century, flexible, adaptable and creative thinking skills to solve problems. Despite all the research and policy implementation, there appear to be significant challenges in ensuring that individuals have an adequate understanding of creative processes (Coate & Boulos, (2012: 130). The oppressive attitude of the society in which individuals live, the oppressive attitude of the family or the work environment or the coercive tendencies of the school may cause them to withdraw from creativity and innovation. These situations mean that a rigid hierarchy exists and the idea of creativity is lost before it is realised.

There may be many factors that prevent the effective application of creative thinking methods. Myths, attitudes, self-blame are some of them. When creative thinking is inhibited, solutions to problems may be delayed. In addition, temporary solutions far from the source of the problem are acceptable. Recognising the common barriers to solving complex problems provides a way to eliminate them (McCuen, 2023:81). One of the enemies of creativity and innovation, especially in relation to the personal development of the individual, is common sense (Robinson & Aronica, 2009: 39). In some cases, individuals acting in accordance with the rules and exhibiting the behaviours expected by the society may become an unwitting obstacle to creativity and innovation. Creative and innovative individuals are able to think differently and exhibit behaviour that can exceed the limits of the mind and sometimes go beyond the norms. In this case, a routine life can become one of the strongest obstacles to creativity and innovation.

The group environment in which individuals are involved may affect the creativity of the individual. In environments where creativity and innovation are not valued, individual and group creativity will be severely restricted (Nijstad & Paulus, 2003:332). In order not to hinder students' creativity in individual or group project work in the classroom, the teacher's approach should be to withdraw from the teaching centre and move to a guiding position (Singer, 2009: 319). If the society to which individuals belong and the school or family environment of their education are in an environment where innovation and creativity are not valued and not needed, it does not seem possible for individuals to discover and produce something new.

1.7. Qualities of Creative and Innovative Individuals

Creative and innovative individuals have certain qualities. In general terms, the characteristics of creative and innovative individuals are actually the qualities that all people potentially carry. These characteristics that make individuals creative and innovative develop over time.

Every human being has the potential for creativity. New perceptions, ideas and experiences are within everyone's reach. However, the number of individuals who do something new, see differently and change the way of doing something new is quite small (Nakamura & Csikszentmihalyi, 2003:189). Creative/innovative individuals differ from others in that they focus on and experience more intensely the processes that bring out their appropriate qualities in specific situations. In fact, they have most of the characteristics mentioned in other people (Walesh, 2017: 241). It can be said that creative and innovative individuals are generally: empathetic, sensitive, hardworking, passionate, introverted-extroverted, modest and proud, highly imaginative and contrary, risk-taking and courageous, open-minded, curious and determined. These qualities are like a compass that enables individuals to look at the world they live in from a different perspective. These qualities can be seen as the basic elements of being a creative and innovative individual.

1.7.1. Being Empathic

Being empathic requires looking at the world not only from one's own perspective but also from the perspectives of others. This situation is important in terms of enriching individuals' tendency to generate ideas by developing different perspectives in the process of creativity and innovation. Being empathic can provide human-oriented solutions as it will add the richness of understanding the feelings of others and feeling their needs in the innovation process.

Innovative individuals tend to be empathetic, but not all empathetic people are innovative (Walesh, 2017: 217). Empathy is the habit of mind that allows us to think of people as human beings rather than laboratory subjects or standard deviations. Empathy is borrowing the life of others as a source of inspiration to reach new ideas (Brown, 2010: 46). Creating something new has the power to enrich life by activating emotions through images, shapes, textures, sounds and smells. Opportunities for interaction and active participation require the use of empathy and knowledge about people for creative design (Brown, 2010: 109). Being empathetic is important for developing human-oriented solutions in creativity and innovation. The way for individuals to find a more humane, emotionally touching solution to a problematic situation in the society they live in is through empathi c behaviour. In this way, the product of creativity and innovation can be accepted and used more quickly by the society.

Sensitive individuals have the personality trait of being able to examine their environment in more detail. This can enable sensitive individuals to see blind spots and details not seen by others. In this way, this process can be a source of inspiration for a creative idea.

One of the most important characteristics of creative individuals is that they are often exposed to pain and suffering due to their openness and sensitivity. In general, every human being can

understand pain. However, individuals with creative qualities may feel a deeper sensitivity that other people do not feel. Rabinow: 'Inventors have a low pain threshold. Many things disturb them.' His word reveals this situation more clearly. So much so that a poorly designed device can be an example of a creative engineer suffering, and a creative writer being hurt while reading a poorly written article (Csikszentmihalyi, 2007: 93). Individuals with a sensitive soul or a sensitive soul tendency feel many emotions deeply. Creative individuals tend to creative outlets instead of suppressing these emotions (Wagner, 2017: 101). Sensitive individuals think more deeply about a problem they face and these thoughts can enable them to produce solutions and take a leap of creativity. Creativity and innovation are initiatives fuelled by emotional depth. The discoveries and artefacts of a sensitive scientist can have a shocking effect on people.

1.7.2. Being Hardworking

Creativity and innovation begin with the introduction of an idea. Concretising the idea and transforming it into a product is a process that requires patience, labour and overcoming difficulties. In this process, it is possible for individuals to achieve unsuccessful results in their attempts. At this point, diligence is the driving force that requires constant repetition, practice, mastery and never tiring of trying new ways. For this reason, individuals with creativity and innovation have to be hardworking.

With the 21st century, what individuals know is becoming less important than what they can do with what they know. In the 21st century, the most important skill that students should master is to increase their interest and ability to create new knowledge to solve new problems. All successful innovative individuals are those who have acquired the ability to learn on their own and on the fly and have mastered the ability to apply what they have learnt (Wagner, 2012: 165).

The emergence of creative ideas is very important. However, in order for these ideas to be realised and transformed into products that are beneficial to society, hard work, which requires perseverance and determination, must also be put to work.

1.7.3. Being Passionate

Being passionate means that an individual has intrinsic motivation about a subject. Individuals with this inner strength may have a great desire to discover new ways to overcome all the obstacles they face regarding their targeted projects and solution proposals.

Most individuals with creativity have the characteristic of being overly passionate about their work. The reason for this is quite clear. Because without passion, interest in a difficult task or work disappears in a short time (Csikszentmihalyi, 2007: 92). Michael Jordan and Picasso, who have success stories, were not at the end point when they first started. However, both were able to

overcome many difficulties with their work. They never lost their passion for their work. They stayed true to the unique vision they had conceived in their minds. As a result, instead of rejecting the world, they began to accept it and became highly original and creative people in their own fields. So they demonstrated how important passion is in creativity. It is about passion when individuals resist giving up an idea, a vision, not only to improve their skills but also because it is not part of the same general acceptance or may be rejected by the majority. This paves the way for passion and creativity (Vallerand, 2015: 268). Creativity and innovation are likely to escape the passionless individual. Passion is the driving force to keep going despite obstacles and setbacks. Failures, lack of support, negative criticism and other setbacks cannot deter the passionate individual from his/her goal (Walesh, 2017: 227).

Being passionate is a state that triggers and feeds internal motivation. The passion of creative and innovative individuals can make them put all their energy into bringing their ideas to life. The energy and determination of passionate individuals is in constant motion to push boundaries and find new solutions. This can enable a passionate individual to generate more effective and lasting solutions for the creative and innovation process.

1.7.4. Introversion/ Extroversion

Introverts are people who feed on their emotions and are inspired by their loneliness. Listening to individuals' feelings can make them think deeply. This allows them to discover something new when they are alone. Extroverts are intertwined with the society they live in. This can provide a source of inspiration from their interaction with society.

People who are characterized by creativity have opposite tendencies, with a continuum between extroversion and introversion. In general, individuals tend to be either introverted or extroverted. However, creative individuals can express both characteristics at the same time (Csikszentmihalyi, 2007: 84). Creative scientists are more extroverted than people who are less creative. This is a situation arising from the trust component rather than the sociability component of extroversion (Feist, 2017: 71).

Whether individuals are introverted or extroverted can affect creativity and innovation processes in different ways. It is important for both personality traits that individuals learn to use the creativity potential they carry within them. Although introverted and extroverted scientists have different sources of inspiration, they both enter the discovery process by feeding on their emotions.

1.7.5. Being Humble and Proud

The modesty of creative individuals ensures that they are aware of their success and that they are self-confident about their new work with this awareness. Humble individuals respect different

opinions and are open-minded. As humble individuals are self-confident, they are also prone to working collaboratively, which can open up different avenues for creativity and innovation. Pride is important for intrinsic motivation. This situation points to a process that triggers and feeds the process of creativity and innovation.

Another characteristic of creative individuals is that they are very modest and proud. This is because of the respect they have for the field they work in. Creative and innovative individuals recognize their previous contributions to the field and put their own contributions into perspective. Secondly, they are conscious of the role that luck plays in their success. Third, they are so focused on their future projects and current challenges that their past achievements, no matter how great, have lost their appeal (Csikszentmihalyi, 2007: 87). Humble and proud individuals are aware of their past achievements. This can give them a sense of self-esteem and self-confidence. In this case, humble and proud individuals can reach new ideas and products more easily with the energy given by the intrinsic motivation provided by self-confidence.

1.7.6. High Imagination and Contrarianism

Individuals discovering something new can be considered as going beyond the limits of their existence. People with high imagination have the will to think far beyond their current position, to think and realize the non-existent with a contrary idea.

Creativity involves imagination. When individuals make connections, i.e. detach themselves from their current position, they often use the ability to imagine to internalize their perceptions and explore a range of possibilities (Duffy, 2006: 22).

Individuals with high imagination open up new possibilities by challenging standard patterns and generating different, unconventional ideas. To be an outlier is to take an innovative stance by questioning the general assumptions of society and the environment by supporting imagination and daring to act contrary to the norms. This situation is important for individuals to gain a creative and innovative identity and start the adventure of production.

1.7.7. Being Open Minded

Individuals with creative qualities tend to approach the information and ideas they hear and see around them without prejudice. Open-minded individuals are more inclined to examine and accept different, contrary ideas. This paves the way for them to access new ideas more easily and to have the courage to experiment and take risks to realize new ideas.

Open-mindedness is a personality trait that can be developed. Individuals who develop this characteristic may have a responsible intellectual structure. The factors for individuals to be open-minded are upbringing, environment and genetic factors (Wright, 2021: 246). Open-mindedness is

one of the intellectual traits most emphasized and appreciated by scientists. Because open-mindedness is prone to new and challenging ideas (Spiegel, 2019: 6).

Open-minded individuals tend to tolerate criticism and learn from it in their attempts at creativity and innovation. This motivates them more than giving up in the face of difficulties. This can be an intrinsic motivation and inspiration for creativity and innovation.

1.7.8. Being Determined

Creativity and innovation processes are often characterized by difficulties and obstacles. It is important that individuals show a determined attitude to overcome these difficulties and obstacles. Taking decisive steps towards success can open the door to new ideas. Determined individuals are not discouraged by failure and are not afraid to try again. This characteristic can increase the motivation needed for goal orientation in the process of creativity and innovation.

The fundamental factor that determines a creative life is the will moving through time. It requires a relentless determination to live a successful life, to make sense of the world, to solve some of the mysteries of the universe. When a child's parents are loving and encouraging, there is a wonderful opportunity for the construction of an individual (Csikszentmihalyi, 2007: 84).

Being successful in the process of creativity and innovation requires patience, coping with difficulties, and other behaviors. In this respect, determination is a key element for creativity and innovation.

1.7.9. Being Curiosity

Curiosity can be considered as the starting point of creativity and innovation. It is curiosity that triggers individuals' desire to learn something new. When individuals tend to ask questions in the family, environment and school, they will take the first step towards creativity.

Curiosity arises from a vacuum of knowledge. People want to learn new information about things they do not understand. The ability to question triggers the leap to close this gap. Inquiry and curiosity are the root of wisdom and the guide to empathy (Nixon, 2020: 6). Pausing to wonder about something encourages new questions to arise. A sentence beginning with the phrase “I wonder” necessarily ends with a question mark. The sense of curiosity likes to break free from the constraints of existing knowledge and experiment with a new way of being and acting. The only way for individuals to make a leap of creativity is to start with curiosity (Nixon, 2020: 14). The starting point of children's first learning in the family and at school is a sense of curiosity. Curiosity is an important element that nourishes and encourages learning. The first small steps on the journey of creativity and innovation are accompanied by the development and triggering of a sense of curiosity. In order for

individuals' creativity and innovation initiatives to achieve successful results, their sense of curiosity must be satisfied.

1.8. Creativity and Innovation in Social Studies Teaching

There is a growing consensus around the world that basic education students need to be able to adapt to the changes of the 21st century. It is stated that students should be both critical thinkers and effective communicators. The social studies curriculum emphasizes the interconnectedness of people sharing the same planet and tries to pave the way for a global focus. The 21st century skills that emerged through the collaboration of policy makers, business leaders and educators are leading the way in defining the skills that students need to acquire in order to be successful in the future (Zarrillo, 2012: 13). 21st century skills are defined in three categories. Among these categories, "learning and innovation skills" are divided into sub-components. The first of these components is the "creativity and innovation" sub-component. In this context, the 2018 Social Studies Curriculum and the 2024 Social Studies Curriculum emphasize content related to creativity and innovation.

2018 SSC, in the competency "taking initiative and entrepreneurship" under the title of Competencies: "It refers to the ability to transform one's thoughts into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects to achieve goals." It is seen that it emphasizes the acquisition of creativity and innovation by students. In the 2018 SSC, it is seen that "Innovative thinking" skill is included among the skills targeted to be taught. In the explanation part of the learning areas: It is seen that there are contents for creativity and innovation skills. In the 2018 SSC statement under the heading "Ministry of National Education Curricula": "Rapid changes in science and technology, changing needs of the individual and society, innovations and developments in learning-teaching theories and approaches have directly affected the roles expected from individuals. This change defines an individual who can produce knowledge, use it functionally in life, solve problems, think critically, be entrepreneurial, determined, have communication skills, empathize, contribute to society and culture, etc." emphasizes creativity and innovation skills (MEB, 2018). 2024 SSC includes the tendency of "Creativity" under the title of "Intellectual Tendencies". In addition, the "Economy in Our Lives" learning area contains content related to innovation processes (MEB, 2024).

In order to meet the learning needs of all students and to teach them essential, critical skills and concepts, social studies instruction should utilize practices with different levels of instruction and challenge that allow them to interact in meaningful ways. Students' learning progress will make it necessary to use more complex applications. This will lead to a deeper understanding of the study material. In the classroom, students who are considered to have high level abilities, insights, analytical skills and creativity should be encouraged to explore new topics (Beal & Bolick, 2013:

161). The "differentiation activities" in the 2024 SSC can provide an opportunity for creativity and innovation by implementing "enrichment or support activities" for students with different basic assumptions. Teacher-guided lesson practices with an understanding that students are active and at the center of learning can prepare the ground for creativity, innovation and discovery skills. One of the basic approaches of the social studies course, "*social studies as social sciences and social studies as reflective thinking*", wants to educate students with the logic of a scientist who questions, thinks critically, problem solves, analyzes and synthesizes. In this context, it can be said that the social studies course is a course that is predisposed to gain creativity and innovation skills as an approach.

1.9. Sample Activity for Creativity and Innovation

In this section, a lesson plan of 3 lesson hours was prepared in line with the template in the content of the program, taking into account the 2024 social studies curriculum. The lesson plan was designed in accordance with the activity content based on Web 2.0.

5TH GRADE SOCIAL STUDIES LESSON PLAN

Section I

1	**Learning Area**	Technology and Social Sciences
2	**Content Framework**	The Effects of Technological Developments on Social Life
3	**Suggested Duration**	40' + 40' + 40' + 40' = 120 minutes
4	**Key Concepts**	digital footprint, public network, e-commerce, technology
5	**Learning Area Description**	In this learning area, it is aimed to provide students with knowledge and skills about the importance of the conscious use of technological products and the effects of inventions and technological products on social life.

Section II

Conceptual Skills	**CS2.18.** Discussion **(SS.5.6.1)**
Tendencies	**T3.3.** Creativity, **T3.4.** Truth Seeking, **T3.5.** Open-mindedness**,** **T3.11.** Original Thinking
Social-Emotional Learning Skills	**SELS.2.1.** Communication, **SELS.3.3** Responsible Decision-Making Skills
Values	**V8.** Privacy, **V11.** Freedom, **V17.** Saving
Literacy Skills	**LS1.** Information Literacy, **LS2.** Digital Literacy,

	LS4. Visual Literacy
Interdisciplinary Relations	Information Technologies and Software, Science

Section III

1	**Learning Outcome**	**SS.5.6.1.** To be able to discuss the effects of technological developments on social life
2	**Process Components**	a) Provides justifications about the effects of technological developments on social life. b) Identifies inconsistencies in the debates on the effects of technological developments on social life. c) Refute or accept the views on the effects of technological developments on social life.
3	**Pre-Assessment Process**	Open-ended questions are used to determine students' level of knowledge on the effects of technological and scientific developments on human life, safety rules to be followed while using the digital environment, conscious use and fundamental rights and freedoms.
4	**Bridge Building**	Students are asked which technological tools they have and how often and for what purpose they use them in their daily lives. Students are asked to give examples of the problems they encounter during the use of technological products.
5	**Method and Techniques**	Lecture, question-answer, case study, demonstration, discussion, animation group work, design
6	**Tools and Equipments**	Interactive board, EBA contents, textbook, task cards, worksheets

Section IV

1	**Learning - Teaching Practices**	The effects of technological developments on social life in terms of culture, economy, education, health, communication and transportation are examined by using written and visual tools prepared by the teacher and the textbook (LS1, LS4). The first stage of the "Find Together" activity based on Web 2.0 prepared for the lesson is implemented. The class is divided into four groups and the groups are allowed to work in depth on the subject in the closed envelopes drawn by lot (LS2). After the group work, students are asked to present the effects of technological developments on social life to the class with their justifications through the discussion method (SELS3.3). The groups are asked to prepare a poster using one of the Web 2.0. tools suggested in the activity template related to the topic they are working on. After this stage, the class is divided into three groups. Two of the groups serve as discussion groups and one serves as a discussion evaluation group. Discussion topics: "*Technology affects social life positively and technology affects social life negatively*". The different opinions and inconsistencies that emerge during the discussion process are identified by the evaluator students and written on the board. The opinions listed on the board are evaluated by the class. During the evaluation, care is taken to respect personal rights and respect the framework of freedom (V11.3). After this stage, students are asked to fill in the "*Discussion Evaluation Forms*" and express themselves (T3.3, T3.4, T3.5, SELS3.3). At this stage, the posters prepared by the groups and discussion evaluation forms are uploaded to the Padlet Web 2.0 application. In addition, the activity evaluation form prepared by the teacher in the Padlet Web 2.0. application is filled out and the lesson is ended.

2	**Enrichment**	The group of students whose readiness levels are ahead of the class level can be asked to identify a situation that they see as a problem in their environment related to community life and to design and present a product that facilitates community life for this problem. Care should be taken to present the designed product using Web 2.0.
3	**Support**	Students whose level of readiness is below grade level can be asked to prepare a poster with images of technological products and scientists who made inventions. This poster can be made on cardboard or using simple Web 2.0 tools.
4	**Assessment and Evaluation**	The learning outcomes in this learning domain can be assessed by using worksheets with short or long answer items and performance tasks prepared by the teacher in the Padlet Web 2.0. application.

The lesson plan was prepared by considering the content of the 2024 social studies curriculum. The changes made in the 2024 program were reflected in the lesson plan content. The teaching and learning practices, enrichment, support and assessment and evaluation sections of the lesson plan were organized with web 2.0. support. "Find Together Activity" was designed for the learning outcome of the lesson plan.

Find Together Activity

Activity

Course: Social Studies

Class: 5th Grade

Topic: The Effects of Technological Developments on Social Life

Recommended duration: 40+40+40

Learning outcome: SB.5.6.1. To be able to discuss the effects of technological developments on social life

Materials if available: Text Cards, Computer, Internet, Web2 Tools, Interactive Board, Pen and Paper.

Environment: Classroom

Preparation for the Event

Duration: 20 minutes

The teacher writes the question 'What is technology?' on the board and starts the activity. The basic assumptions and readiness levels of the students about technology are revealed. After this activity, the class is divided into four groups and one of the closed envelopes prepared by the teacher is selected by the group spokesperson.

On the text cards inside the envelopes:

- Effects of Technology on Education: Smart boards, online courses, tablet use.

- ❖ Effects of Technology on Transport: Cars, trains, aeroplanes, traffic control systems.
- ❖ Effects of Technology on Health: MRI devices, surgery robots, drug development.
- ❖ Effects of Technology on Communication: Mobile phones, social media, internet.

The topics on the text cards can be added.

Implementation of the Activity

Duration: 80 minutes

At this stage of the activity, the topic on the text card chosen by the group spokesperson is analysed in depth. The tasks given on the text card are meticulously done by the group members. The effects of technology on social life are written item by item.

Tasks given to the groups:

- ❖ The conveniences / difficulties brought by technology should be clearly and clearly revealed
- ❖ The subject should be enriched with examples
- ❖ A slogan related to the subject should be developed
- ❖ Design a poster on the subject in digital environment
- ❖ The group spokesperson should present the work and answer questions sincerely.

Poster Preparation Stage in Digital Environment:

Web 2.0. Tool Selection:

Students can use any of the suggested web 2.0. tools to prepare their posters and presentations, or they can choose the appropriate tools of their own choice.

Some suggested tools:

Canva: A design tool that is simple and full of templates.

Google slides: A presentation tool where students can easily add shapes, text and images to create a poster.

Microsoft powerPoint: Can be used to create digital posters.

Visme: Offers simple graphic design tools.

Piktochart: A simple design tool full of templates

Pawtoon animated presentation preparation programme

In the third stage of the activity, the class is divided into three groups. Two groups are determined as discussion group and one group as evaluator group.

Discussion topics:

- ❖ Technology positively affects social life
- ❖ Technology negatively affects social life

After the group discussion, the evaluation phase is started.

Evaluation of the Event

Duration: 20 minutes

At this stage, 'Discussion Evaluation Forms' are distributed to the whole class. Discussion Evaluation Forms will be uploaded to Padlet Web 2.0. application.

Discussion Evaluation Form Content:

Part I.

1. In the group discussion I realised the following:
2. In the group discussion, I felt that:
3. I was surprised by this in the group discussion:

Part II

1. Write a new information you learnt during the discussion
2. Write down the most interesting moment you noticed during the discussion

Part III

t this stage, the posters and Discussion Evaluation Forms prepared by the groups are uploaded to the Padlet Web 2.0 Application. In addition, the activity evaluation form prepared by the teacher in the Padlet Web 2.0 Application is filled and the lesson is concluded.

2. Conclusion

Creativity and innovation have been a driving force in the development of civilizationfrom the earliest periods of history to the present day. The difficulties and responsibilities of social life have led individuals to seek new ways to make life easier.

Individuals with the qualities of creativity and innovation approach the social problems and environmental situations they encounter with a different perspective than other people and therefore try to find solutions. Creative and innovative individuals have made discoveries and innovations that have pushed the limits of the human mind, with ideas that may be considered contradictory for other members of society, and that have not enabled humanity to live a more prosperous life.

The 21st century has brought development and change, which has also changed the expectations of society from its members. The rapid change in technology and the continuous increase in people's needs have created new problems. As new problems will require new solutions, it is thought that societies need individuals with creativity and innovation characteristics more than ever. In order to meet the needs of 21st century societies and to create a qualified society, education systems should be revised accordingly.

It is very important that education systems and school curricula prepare individuals for the 21st century. In this context, the importance of social studies course teaching is important for the individual to become an active member of society. Social studies curricula and textbooks should prioritize creativity and innovation.

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Chapter 9 – Critical Thinking and Problem Solving

Bülent AKSOY

Chapter Highlights

- Critical thinking
- Reflective thinking
- Creativity
- Decision making
- Problem solving

1. Introduction

Critical thinking occurs in trusting environments where individuals can express their views freely (Wadsworth, 2015; Williams Howe, 2016; cited from Tozduman Yaralı, 2019). Therefore, environments should be created for individuals to think and they should be enabled to express themselves freely. Among the 21st century skills, critical thinking skill is important in terms of learning and teaching processes. The word critical comes from the Greek word kritikos, which means analysing, interpreting and questioning. Kritikos means questioning, understanding the things and people around us and analysing and examining our own thinking processes as well as the thinking processes of others (Emir, 2012). The origin of critical thinking dates back to Ancient Greece. The first name that welcomes us here is Socrates, the inventor of the socratic discussion method, who said 'life without questioning is not worth living' (Özensoy, 2019). Since the early ages, people have built today's world by thinking. Thinking distinguishes human beings from other living things. Of course, thinking alone is not enough. It is necessary to think at a higher level, that is, to think critically. Today's understanding of education is based on gaining high-level thinking skills. The individual who can think at a higher level can use all mental processes together in the problem-solving process.

In fact, criticism can be perceived as showing negative aspects to people at first glance. But when we look at it philosophically, it is a way of thinking. Thinking can be briefly defined as the individual's perception of things that exist outside through the five sense organs, solving existing problems, perceiving the real world by establishing a connection between external events and perceiving the real world and passing these perceptions through planned and regular mental processes by passing them through a mental filter (Balcı, 2021).

The beginning of the question of what critical thinking is and how to teach it can be traced back to the search for correct knowledge in Plato's Socratic dialogues, which attach importance to being in a position to know something before claiming to know it, and that people should investigate what they know and what they do not know before they start to think about something (Gündoğdu, 2009, cited from Göbel, 2013). From past to present, people have made different definitions of critical thinking due to different perspectives and different ways of thinking.

What is expected from contemporary education is to increase the quality of teaching and education by using the mental skills of the individual (Çalışkan, 2009). Higher order thinking skills can be listed as follows; critical thinking, higher order cognitive processes, problem solving, reasoning thinking or creative thinking (Lewis & Smith, 1993; cited from Aydın & Yılmaz, 2010). Dewey stated that practice while learning is an inquisitive process that encourages critical thinking (Dewey, 1933; as cited in Tozduman Yaralı, 2019). Scheffler (1973a) considered critical thinking as the heart

of education. He stated that critical thinking cannot be limited only within the fields of science, but it is also a desired feature and value in different areas of life such as morality, politics and philosophy (Doğanay, Taş & Erden, 2007).

Paul (1995) states that critical thinking is the basic necessity for social, personal and professional adaptation to the 21st century and beyond and therefore critical thinking teaching is necessary. Students need to apply critical thinking skills effectively in their academic studies, in solving the complex problems they face, in making critical decisions forced by rapid technological changes and information explosion (Adsit, 2007; cited from Koç, 2011).

2. Critical Thinking

Thinking is not enough. It is necessary to think critically about something. Thinking is an important form of behaviour that is very necessary at every moment as long as we live. Because when we think, we give direction to our lives. In order to understand what critical thinking is, firstly 'what is thinking?' this question needs to be clarified. Thinking is the mental process that takes place as a result of the individual whose internal balance is disturbed in the face of some reasons and in order to get rid of this state. According to Paul (1992), critical thinking should be considered in the context of perfecting ideas. The ideal critical thinker is a person who is curious in nature, open-minded, flexible, moderate, has a desire to be informed, understands different points of view, considers other points of view and is willing to postpone judgement (Cited from Korkmaz, 2018).

Thinking is a reaction to the knowledge we have. The individual reacts to events throughout his/her life and starts to think in the process. Thinking is an important form of behaviour that is very necessary in every aspect of our lives. Because when we think, we direct our lives. Thinking involves mental processes such as examining an event, problem solving, reasoning, reflecting and criticizing, and is based on establishing meaningful connections between concepts or events and drawing conclusions (Gömleksiz & Kan, 2009).

Thinking starts with a problem, and the solution of the problem turns into a goal for the individual. This purpose directs the individual's thinking. These stages constitute the problem-solving process. In this process, students are expected to acquire high-level thinking skills' (Kalaycı, 2001; Ersoy & Başer, 2011). Critical thinking has many definitions in the literature. If we look at these; in Ennis' (1962) article The Concept of Critical Thinking, which is accepted as the milestone of the concept of critical thinking in education, this skill is defined as "making correct evaluations about situations or problems". According to Dewey, critical thinking is defined as reflective thinking (Vural & Kutlu, 2004). Critical thinking is an affective and mental process that involves multidimensional questioning, examining, disciplined, impartial and effective application of thinking processes,

evaluating and developing new situations and products based on criteria (Çalışkan, 2009). Critical thinking means being able to self-regulate and evaluate oneself and to think conceptually (Facione, 1990; cited from Çalışkan, 2009). Critical thinking is the skill that enables an individual to evaluate and make a judgement according to standards and criteria by constantly questioning the information obtained. Critical thinking is the process of evaluating the truth or falsity of any argument, situation or event and making decisions. Critical thinking can be defined as a disciplined and self-controlled way of thinking in order to reveal complete and perfect thought (Gömleksiz & Kan, 2009).

Briefly, critical thinking in the broadest sense is to prove the accuracy, reality and reliability of an individual's information or claim (Özdemir, 2005). It is a sincere and honest mental activity such as seeking evidence about the information read or obtained before deciding on any subject, asking for the source of the information conveyed to the individual, acting in a measured and balanced manner while making decisions.

2.1. Characteristics of Critical Thinking

Critical thinking has some salient features. Nosich (2012) analyses them under 4 titles.

1. Critical thinking is reflective. In other words, it is a meta-cognitive process that involves thinking about our own thinking. Everyone has their own rights and wrongs. The opinions we express are an example of thinking, but not necessarily an example of critical thinking. If we want it to become critical, then we need to reflect on our own thinking. For example, why do I hold the views I do? Can I base my views on evidence? On what basis can I say whether my views or their views are more correct?

2. Critical thinking involves standards. That is, our thinking is according to a criterion. Criterion means that our thinking is right-wrong, relevant, in-depth research, etc.

3. Critical thinking is realistic. What we mean here is essentially the process of thinking about real problems. The real problems we face in life are handled by the existence of critical thinking.

4. Critical thinking requires rationality. Actually, we can talk about an awareness here. There are certain rules for driving a car. Knowing the rules does not make you a good driver. It is necessary to apply the rules logically. For example, even if you have the right of way, if your action puts the other party in a difficult situation, it is necessary to fulfil this action in the healthiest way in terms of traffic health (Cited from Aybek, 2012).

2.2. Critical Thinking Components

The components that make up critical thinking were created by Faccione and explained the components as follows:

• Analyzing: It is to identify the relationships between situations, problems, definitions or concepts such as beliefs and various representations designed to indicate beliefs, knowledge and opinions.

• Interpreting: To determine and understand the meaning and significance of various experiences, situations, data, events, beliefs, rules, procedures.

• Self-regulation: It is to control one's cognitive activities and the components used in these cognitive activities. It is to make arrangements according to the results obtained.

• Making Inferences: It is to identify the components necessary to draw logical conclusions, to formulate hypotheses and predictions, to take into account the information about the subject, to reach conclusions based on data, opinions and definitions.

• Explanation: It is to determine the state and process of one's reasoning.

• Evaluation: Evaluating claims and discussions (Cited from Duğan & Aydın, 2018).

The characteristics of a thinking individual are as follows:

1. Has developed questioning skills.

2. Can evaluate situations and discussions and can admit when there is a lack of knowledge or understanding.

3. He/she is very curious and willing to find new solutions.

4. Makes use of criteria, evidence and comparisons to analyze ideas.

5. listens to others and gives feedback.

6. postpones his/her decision until the end of all these processes and rejects inaccurate or irrelevant information if necessary (Cited from Şenşekerci & Bilgin, 2008).

In the study conducted by Kökdemir in 2000, individuals with critical thinking skills were explained as follows:

1. Capturing the differences between proven facts and asserted claims,

2. To be able to test the reliability of the sources of information obtained,

3. To be able to eliminate irrelevant information from evidence,

4. Awareness of prejudice and cognitive errors,

5. Recognize inconsistent judgements,

6. To be able to ask effective questions,

7. To be able to use oral and written language effectively,

8. Metacognition in which the individual becomes aware of his/her own thoughts (cited from Özensoy, 2019).

A well-trained critical thinker:

1. raises important questions and issues clearly and concisely.

2. Gathers and evaluates relevant information, reaches well-reasoned conclusions and solutions to interpret abstract ideas effectively, testing them against relevant criteria and standards.

3. think open-mindedly within alternative systems of thought, accepting and evaluating their assumptions, conclusions and practical implications when necessary.

4. Communicates effectively with others in finding solutions to complex problems (Arslanyürek Sezer, 2021).

When the characteristics of a critical thinking individual are examined above, we see that many characteristics are common. Raising individuals with critical thinking skills through education will contribute greatly to the development of both society and the individual.

2.3. Critical Thinking and Creative Thinking

Critical thinking and creative thinking are often mentioned together. While creative thinking is seen as putting forward a new design or idea, critical thinking means the evaluation and questioning of all these (Gömleksiz & Kan, 2009). Critical and creative thinking are inextricably linked and are common aspects of effective thinking (Çimşir, 2019). Therefore, it can be said that creative thinking is also related to critical thinking, decision making and problem solving. Gibson (1995, cited from Gömleksiz & Kan, 2009) also stated that critical thinking is associated with mental processes such as reasoning, problem solving and decision making and that these concepts are often used interchangeably. However, he also stated that there are some differences between them. When we look at all definitions, it is noteworthy that there is a parallelism between critical thinking and problem solving. However, it cannot be ignored that critical thinking also has common points with creative thinking. Therefore, it can be said that thinking skills form an intertwined structure (Vural & Kutlu, 2004).

2.4. Critical Thinking and Reflective Thinking

Reflective thinking is a concept based on pragmatic philosophy and related to the progressivism movement, showing a continuous development and frequently mentioned in teacher education Dewey, who is seen as the pioneer of the modern critical thinking tradition, explained

critical thinking using the concept of reflective thinking and defined it as follows: Active, continuous and careful reflection on a belief or knowledge in the light of the grounds that support it and the results it tends to (Koç, 2011). Reflective thinking: It is the process of thinking to reveal positive and negative situations related to the individual's teaching or learning method and level and to solve problems (Meral & Semerci, 2009).

According to Dewey (1991), reflective thinking is the effective, careful and coherent consideration of a piece of information or thought and the information structure that helps to achieve the results that this information or thought aims at. Reflective thinking is the process of making logical decisions on educational problems and then evaluating the results of these decisions (Taggart & Wilson, 1998; cited from Ünver, 2005). The concept of reflective in Ennis' definition is also included in the definitions made in previous periods. However, Ennis emphasizes decision making and considers decision making as a part of critical thinking (Hagelskamp, 2000; cited from Meral & Semerci, 2009).

2.5. Critical Thinking Skills and Education

Critical thinking is a multifaceted process involving many mental activities. An individual with critical thinking skills questions the reasons for a problem, is open to new ideas, respects the opinions of others, tries to reach reliable sources, tries to determine the main point without getting stuck in details, takes others into consideration, but also forms his/her own opinions based on scientific foundations (Doğanay, 2000; Can & Kaymakçı, 2015). Skills are related to the ways in which people who can think critically analyze, draw conclusions, evaluate, make assumptions, draw inductive and deductive conclusions, and make judgements (Ersoy & Başer, 2011). Critical thinking skill is described as follows: Critical thinking is the ability to look at issues, make comments and make decisions with a questioning approach based on doubt (Acun, Demir & Göz, 2010).

Watson and Glasser (1964) define critical thinking as a general process involving acts such as questioning, problem solving and research. They view critical thinking as both a skill and an attitude and examine it in five dimensions. These can be listed as follows:

- the ability to recognize the problem
- ability to select appropriate information for solving problem
- the ability to take into account identified or uncertain situations
- the ability to select, formulate and hypothesize relevant information
- the ability to judge the validity of conclusions and inferences (Çalışkan, 2009).

Mariorana (1992), on the other hand, points out that critical thinking focuses on the processes of understanding, evaluating perspectives and problem solving, and that these three areas include the

behavior of asking questions. He also emphasizes that in order to talk about the existence of critical thinking, it is inevitable to talk about understanding, solving and evaluating behaviors (Vural & Kutlu, 2004).

The critical thinking dispositions put forward by Facione, Facione, and Giancarlo (2000) are as follows

• Analyticity: It shows the tendency to be careful about situations that may cause problems and to use reasoning and objective evidence even in the face of difficult problems.

• Open Mindedness: It refers to the individual's tolerance towards different approaches and sensitivity towards one's own mistakes. In this dimension, the individual considers the opinions of others when making a decision.

• Inquisitiveness: It reflects the individual's tendency to acquire knowledge and learn new things without any interest or expectation.

• Self-Confidence: Refers to the confidence in one's own reasoning processes.

• Cognitive maturity (Maturity)

• Systematicity: The tendency towards organized, planned and careful research.

• Truth-Seeking: In this dimension, which includes the tendency to evaluate options or different opinions, the person shows the tendency to search for the truth, the ability to ask questions, and the tendency to act objectively even in the face of data contrary to his/her own opinion (Can & Kaymakçı, 2015).

In his study, Quitadamo (2002; cited from Ersoy & Başer, 2011) argued that in order for students to think critically, they should be at the center of learning. In order to learn the course content in a permanent way in educational processes, students need to process information effectively in this process rather than memorizing information. For this, small group studies and applications should be carried out with students in the classroom. This is possible only if the content and methods of teaching are designed in such a way that students acquire skills such as creative, critical and scientific thinking and reasoning (Emir, 2012).

Ennis (2001) classified critical thinking skills as clarification, basic support, inference, advanced clarification, strategy and technical skills in five basic aspects (Doğanay, Taş & Erden, 2007). Robert Ennis, who stated that critical thinking consists of abilities and tendencies, itemized critical thinking skills (Fisher, 1995; cited from Aybek, 2007).

• Searching for a clear statement of the thesis or problem,

- Don't look for reasons,
- Don't try to be well informed,
- Use reliable sources and indicate the sources used,
- Considering the situation in its entirety,
- Don't try to stick to the main point,
- Keeping the main or fundamental problem in mind,
- Search for options,
- Don't be open-minded,
- Demonstrate decision-making behavior when evidence and reasons are sufficient,
- Seeking as much certainty as the subject matter allows,
- Dealing with the parts of a complex whole in an organized way,
- Being sensitive to other people's feelings, knowledge and cultural levels.

It is known that people with critical thinking skills do not accept events or facts without questioning. The fact that students make retrospective evaluations at the decision-making stage in the face of a situation is an indication that they can think critically. While students find constructive solutions to the problem, their problem-solving skills and critical thinking skills develop. Individuals who can think critically are successful in decision making and problem solving" (Chaffee, 1994; as cited in Kökdemir, 2003; Korkmaz, 2009). Based on this aim, primary school students need to understand what is going on around them, recognize problems and find solutions to problems. New teaching environments should be provided for primary school students to be successful and think critically (Ersoy & Başer, 2011).

Among the skills involved in the critical thinking process are: capturing the difference between proven facts and asserted claims; testing the reliability of the sources of information obtained; extracting irrelevant information from evidence; bias; recognizing inconsistent judgments and being aware of cognitive errors; asking effective questions; using oral and written language effectively; and metacognition, in which the individual becomes aware of his/her own thoughts (Korkmaz, 2009).

According to McPeck (1981), all dimensions of thinking are important and there is no general set of critical thinking skills. Therefore, it is useless to teach critical thinking as a separate skill-based course. Paul (1991) emphasizes that exemplary critical thinking elements, standards, mental

characteristics and critical thinking skills should be taught within specific subject areas and disciplines in order to ensure that students grow up as strong critical thinkers (Aybek, 2007).

Based on the existing definitions of critical thinking, (McKnown 1997; cited from Vural & Kutlu, 2004) synthesized that the two basic components of critical thinking are evaluating reasoning and critical thinking effort (Table-1).

Table 1. Two basic components of critical thinking (Mcknown, 1997)

Reason Assesment	Skills and dispositions involving making appropriate inferences, evaluating claims, arguments and reasons
Critical Spirit	The tendency to apply critical thinking skills. For example, personal characteristics, temperament, behaviour, and habits, etc.

Facione (1990; cited from Tozduman Yaralı, 2019) classified the cognitive sub-dimensions of critical thinking under six headings in his Delphi project. These are; interpretation, explanation, evaluation, inference, analysis and self-regulation (Table-2). If we analyze;

Table 2. Critical thinking skills facione (1990; cited from, Tozduman Yaralı, 2019)

Interpretation	Various situations, experiences, data, events, judgements, etc. Understanding and expressing the meaning or importance of criteria
Analysis	Various situations, experiences, reasons, etc. Identify intended and actual inferential relationships between concepts and types of explanation
Do not make inferences	Identifying the elements necessary to reach logical conclusions; forming assumptions and hypotheses
Evaluation	Various situations, experiences, data, events, judgements, etc. Assessing the reliability of presentations and the logical strength of inferential relationships between types of presentations
Description	State the conclusions of the reasoning and present the reasoning in the form of persuasive arguments
Self-regulation	Analysing and evaluating one's own conclusions to analyse by using their skills

The tables given above (table-1,2) should be analyzed and criticized by making an inference.

The characteristics of thinking can be listed as follows:

- Establishing logically meaningful relationships between variables, eliminating meaningless connections.
- Verifying and falsifying the validity of the solution proposals developed by generating new information from a set of information,
- Reflecting flexibility, creativity and developability in thinking processes,
- Holistic and multidimensional approach to the problem,
- Establishing structurally and semantically consistent relationships between variables and testing them consecutively with appropriate number and quality of observations,

• According to the results of the verified experiment, gradually limiting the problem area, defining the problem and reporting valid solutions (Aydın, 2000; Şen, 2009).

In addition, McKnown (cited from Vural & Kutlu, 2004) lists the basic features of critical thinking as follows:

1. Critical thinking is based on reasoning: The inferences obtained in the critical thinking process should be based on appropriate, valid and sound evidence and should not be arbitrary.

2. Critical thinking requires in-depth thinking: Developing a thought requires consciously evaluating one's own and others' thoughts.

3. Critical thinking requires focus: It requires thinking with a purpose. This purpose is to make the best decision about what the individual does or believes.

Yetim and Göktaş (2000) stated that the development of a country and the welfare level of the society depend on teachers being well trained and having professional and personal qualifications to fulfil their duties in the best way. In addition, critical thinking skills and self-confidence are among the personal and professional qualities of teachers (Can & Kaymakçı, 2015).

The related literature mentions four basic approaches considering the discussions and programmes carried out to develop critical thinking. These approaches are;

1) Subject-Based Education Approach: This approach, advocated by Glasser (1984) and McPeck (1981), envisages teaching critical thinking together with the content unit to be taught. In this approach, the principles and rules of critical thinking are clearly taught to students in parallel with the content unit.

2) Topic Integration Approach: This approach is similar to the first approach, but proposes to integrate the content unit and the rules and principles of critical thinking. However, these rules and principles are not given explicitly.

3) General Approach: It is structured completely differently from subject-based teaching.

Critical thinking skills are a skills-based programme developed on the basis of a content other than the non-school context.

4) Combination: This approach, which is also adopted by Ennis (1989), Perkins and Solomon (1989), envisages the use of both the topic-based approach and the general approach together (Glaser, 1984; McPeck, 1981; Kruse & Prenssesisen, 1987; Sternburg Bhana, 1986; Ennis, 1989; Perkins & Solomon, 1989; Mcknown, 1997 cited from Vural & Kutlu, 2004).

3. Problem Solving

The concept of problem is one of the frequently used concepts in daily life. Especially the difficulties, troubles and problems encountered in social life are expressed with this concept. In education, the numerical finding of the result depending on some values given in science (mathematics, physics and chemistry) is stated as the problem and its solution. It is wrong to see the problem as a concept belonging to limited branches of science. A problem is an obstacle that stands in the way of the existing forces that a person has gathered in order to reach the desired goal. If a person encounters some obstacles while endeavoring to reach a certain goal or understanding, it means that there is a problem for him/her.

John Adair (2000) defines a problem as 'a problem is a situation that is thrown in front of you and prevents you'. Stevens (1998) defines a problem as the obstacles and difficulties we encounter during the transition from one environment or situation to a more preferred environment or situation, and problem solving as the process of transforming certain conditions into another preferred situation. Vangundry defines the problem as the gap between what is and what should be, and Kneeland (2001) defines it as the difference between the state of something and its current state. Problem solving is defined as the effort to eliminate this difference. Akgün (1995: 96) states that a problem is a kind of question for which there is no answer at the moment, and the answer is possible when it is investigated and analyzed. It is such a question that can eliminate a difficulty when the answer is found. The answer will be learnt by asking, examining, in short by collecting information. When the answer is found, a difficulty will be overcome (Yaman, 2003). According to Lumsdaine and Lumsdaine (1995), a problem is not an assignment that is given to the student to find and a missing point needs to be completed. A problem is anything that can be better and different with some changes. A problem has two characteristics: A problem may contain a challenge or it may represent an opportunity. Both characteristics may be present in a problem, or only one of them may be present. Problems usually consist of situations of uncertainty, uncertainty of truth and reality, difficult problems and relationships. In other words, a problem is a situation of tension, imbalance, incompatibility and uncertainty. It is these characteristics that make them problems (Kalaycı, 2001).

If all of the above-mentioned problem definitions are analyzed in general, three basic characteristics emerge.

• The problem is an obstacle for the person who encounters it: The word obstacle is common in almost all definitions. However, the obstacle varies according to the nature of the problem encountered. The problem-solving process never has a magical and unknown formula. The most important point is to find the method that is suitable for the individual, the working style of the individual, the society, any business, the functioning of the business and to transform this method

into a skill. An instructor should teach problem solving methods and techniques to his/her students through lectures by using the problem-solving method. The student can use the problem-solving skills taught through the courses at every stage of his/her life. Because human beings have to deal with their environment and problems with their own power.

- The problem is the situation that the person needs to solve.
- The person has not encountered the problem before and has no preparation to solve the problem (Kalaycı, 2001).

According to these characteristics, the fact that a situation or event can be a problem depends on the fact that it brings some difficulties and discomfort for the person. The person who has not encountered this situation before will feel the need to make an effort to overcome this difficulty and will strive to solve the problem.

Although we encounter various problems throughout our lives, we do not dwell on most of them concretely. They pass by as some difficulties in our lives. Since we prepare students for life at school, we should give them the solution to problems at school. This should not be a subject of a lesson, but an activity that can affect their behaviour. Students should be able to think better and reach problems with a scientific approach. Thus, they will reach the result more easily and the result will be useful (Akgün, 1995). The stages of a problem can be shown schematically as follows:

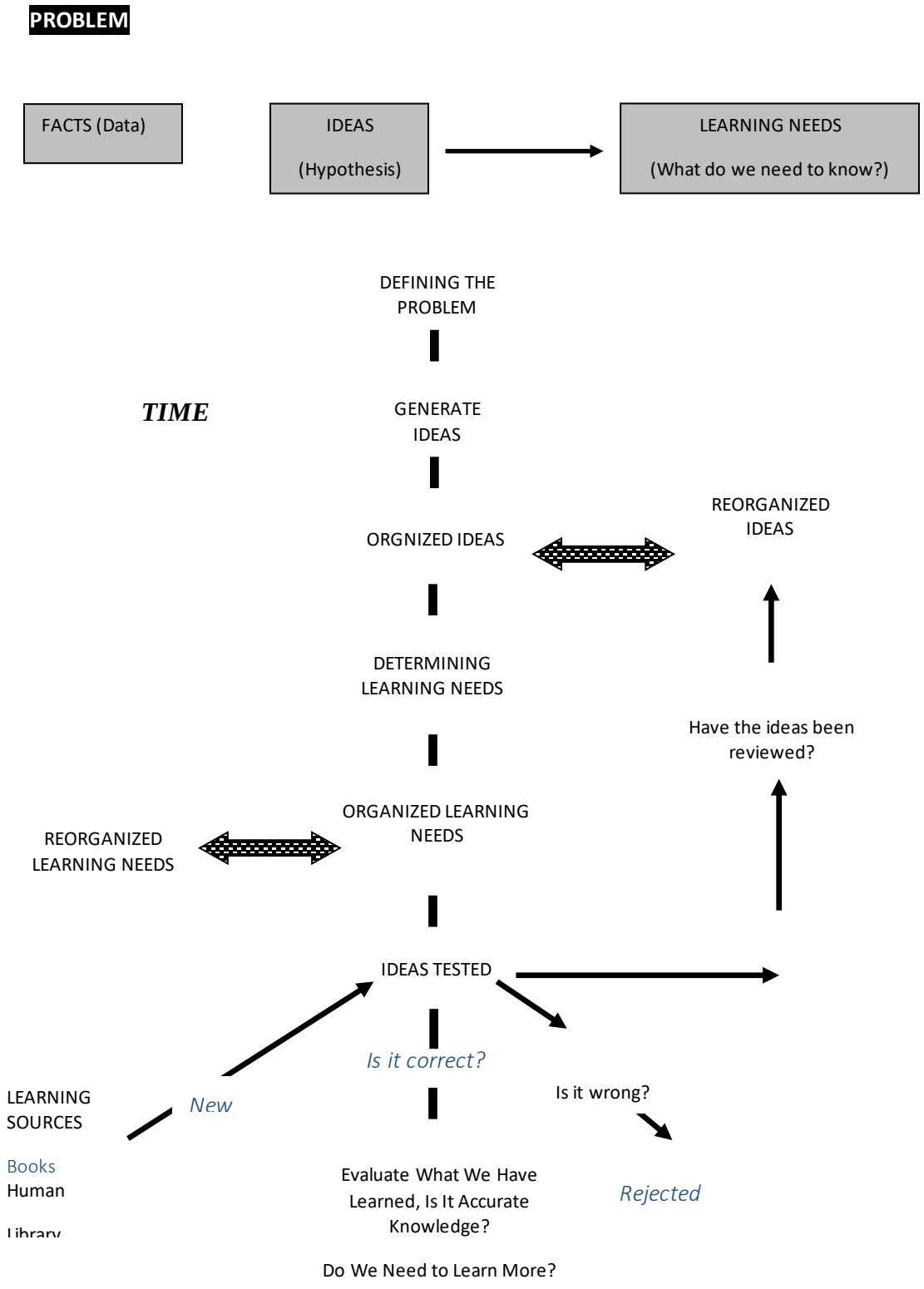

Figure 1. Demonstration of the stages of problem solving with a diagram (USC CCMB/Fincham (1999, Cited from Yaman, 2003)

3.1. Types of Problem

Problems are divided into two parts as structured problems (with single solution) and unstructured problems (with multidimensional solution).

- Well Structured Problems: These types of problems usually have a single correct answer and certain strategies help to find this correct answer. For example, maths problems, physics and chemistry experiments and puzzles (Kalaycı, 2001). In a problem related to the subject of motion in a physics lesson, given the values of speed and distance, the student can calculate how long it takes for a car travelling from point A to reach point B. There is only one correct answer in this problem. In the evaluation, all answers other than this answer will be wrong.
- Ill Structured Problems: It is a type of problem that does not have a single correct answer and covers problems encountered in daily life. Especially Kohlberg's studies on this subject draw attention. One of the sample problems used by Kohlberg is as follows: 'Joe's father promised to take Joe to camp if he earned 50 dollars. But then he changed his mind and asked Joe to give him the money he earned. Joe lied and said that he had earned 10 dollars and kept 40 dollars for himself to use in the camp. Before Joe went to the camp, he told his younger brother Alex that he had lied to his father and the amount of money he had earned. Should Alex tell his father about this?. As seen in the example, there is no single answer to such problems. It depends on the moral structure of the person, the environment in which he/she grows up and the values he/she believes in. Since school is an institution that teaches people about real life, the education provided here should include such problems. The aim of solving well-structured problems is to develop the ability to comprehend the logic and nature of problem solving, to select and use the appropriate strategy when faced with a problem, and to interpret the results (Yaman, 2003).

In general, unstructured problems are defined as situations where there is no clear definition of the problem, determining solutions depends on operations and there are criteria for evaluating the solution (Lohman & Finkelstein, 2000). When solving ill-structured problems, one does not stick to a single discipline. All the accumulation of the person in the fields where he/she has acquired knowledge until then is involved. Knowledge is not only used to find facts; it is also used to learn educational content and to acquire knowledge in other specialized subjects (De Vries & Ton De Jong, 1999). The accumulation of knowledge in each subject can be used to solve the problem. Experts say that real-life problems presented at school can successfully bridge the gap between what students need to know in order to succeed in the real world and what they will learn at school (Blumenfeld, 1991).

3.2. Problem Solving Need

A society which is well acquainted with the mechanisms of problem solving, which is prepared to combine its energies in solving the problems of society, and which is determined to take action to produce well-developed individuals, is making purposeful preparation to meet the needs imposed upon it by a constantly changing civilization. The main purpose of teaching problem solving is to give students the ability to cope with problems when they are confronted with problems outside school life. By teaching these techniques;

- Gaining scientific thinking skills,
- Gaining a sense of responsibility,
- To gain the ability to work in co-operation,
- Gaining communication skills,
- Gaining the ability to manage time,
- Improving attention,
- Comparing real world and school life,
- Gaining data collection skills,
- To be able to analyze the data in accordance with the level,
- To be able to make predictions,
- To be able to visualize information,
- To gain report preparation skills,
- Gaining the ability to make a presentation in front of the community,
- The objectives of gaining the ability to evaluate can be achieved (Kalaycı, 2001).

Problem solving usually involves planning to answer a question, providing a satisfactory response to a complex situation, proposing a solution or showing interest. Activities that can be used in problem solving can be as follows: Scanning resources, checking ready solutions, getting expert opinion, immediate application, team building etc. (Aslan, 2002). The solution of problems varies according to the type and complexity of the problem. Some problems are solved completely through logic. In parallel with the problems in daily life, the problem constitutes the starting point in all kinds of scientific research. Scientific problem solving is a systematic, rational and logical (based on continuous logic) reasoning process. Problem solving starts with a question. With the help of the

teacher, students determine the best question to ask. As a result, they make a generalization based on the evidence they have managed to collect. Here the students are encouraged to ask questions and to follow a logical system of thought. Scientific problem solving describes a process of rational thinking that includes terms such as scientific method, critical thinking, decision-making, reflective thinking and questioning.

3.3. Stages of Problem Solving

Generally, scientists have a common view on the definition of problem solving. Problem solving method is used synonymously with the scientific method. However, scientists propose a scheme different from the theoretical explanations on how to apply the method. The problem-solving stages suggested by Barth (1997) are as follows: Experience stage, diversity and uncertainty stage, problem identification stage, hypothesis formation stage, research and proof stage, generalization stage.

Hicks (1994)'s General Problem-Solving Model has six stages. In this model, it is suggested that everyone should know a problem-solving model, put it into a suitable form for himself/herself and then solve the problem. Stages of the General Problem-Solving Model:

- Problem,
- Collection of data,
- Redefining the problem,
- Generation of appropriate solutions,
- Selection of the best solution,
- Approval and implementation of the solution.

Bogo & Kelly (2000) suggested that no matter which model is applied in problem solving, intensive and continuous efforts should be made on the development of the following five categories for these steps. From time to time, these items have also been adopted as a problem-solving model. The criteria that educators can use in the problem-solving process in order to improve students' problem-solving skills are as follows:

1. Knowledge Base: Knowledge that is concentrated or meaningfully organized for comprehension is very different from the organization of incoherent fragments of knowledge. Cognitively concentrated knowledge can therefore be meaningfully structured using chance, functional, logical relationships. This grouping and organization of knowledge is a means to an end throughout the learning and teaching processes.

2. Skill Base: The transformation of cognitively intensified progressive knowledge into skills follows the same logical sequence. Practices inside and outside the classroom have an important role in the process of transforming knowledge into skills.

3. Resource Base: For a problem encountered, both human and various audio-visual materials may need to be used together at this stage. In addition, since new ideas for creative thinking require new materials, resources should not be limited.

4. Strategy-Experience Base: Strategy and experience are necessary for the precise formulation of the problem or for their transfer. Practices increase expertise. Strategy and experience develop over time.

5. Behavioral Base: This stage is more related to the emotional world of the individual. If the reaction of the individual in the problem-solving process is excessive, this may affect the solution of the problem. For example, if the attention turns into a panic attack, the loss of self-confidence increases in students who have difficulty in solving the problem. As a result, this may become the nature of their personality (Kalaycı, 2001: 30).

Arenofsky (2001) presented the problem-solving model in three steps:

- Identifying the existence of the problem, determining its boundaries and conditions,
- Structuring the appropriate strategy for the problem, collecting data, obtaining the necessary information and resources for the implementation of the strategy
- Observing this whole problem-solving process and evaluating the solution.

Bransford and Stein suggest the ideal model for problem solving as follows:

- Identify the problem,
- Define the problem,
- Investigate possible strategies,
- Acting on strategies,
- Looking at the effects of efforts (Ornstein & Lasley, 2000).

There are also different problem-solving approaches among students. Students at all levels do not have the same approach to a problem. Ornstein & Lasley (2000), who analyzed one of Bloom's

studies, stated the differences between students who are successful and unsuccessful in problem solving as follows:

1. Understanding the Problem: Successful problem solvers start as soon as possible to try the solution and select the signs.

2. Using Prior Knowledge: Successful students utilize their prior knowledge to solve the problem. Unsuccessful students seem to have knowledge, but they do not use it. They do not know how and where to start.

3. Problem Solving Style: Successful students are more active in what they do and explain more. They simplify the problem as much as possible or remove parts that do not relate to the whole. Unsuccessful students give brief descriptions of what they do and rarely classify them. These students make no effort to analyze the parts.

4. Attitude towards problem solving: Successful students behave with confidence in the event of change. Unsuccessful students, on the other hand, lack confidence and are therefore disappointed (Yaman, 2003).

John Dewey, the famous American educational thinker, discussed problem solving and explained this method in his work 'How We Think' published in 1910. Dewey developed the problem-solving method based on the principles he put forward in his theory of reflective thinking. According to Dewey, the thinking process includes a complex problematic situation and a solved situation. There are certain steps in the process of reflective thinking between these two situations. The main ones are; insinuations, suggestions, comprehension, establishing logical relationships, establishing hypotheses to collect the necessary data related to the problem, developing the hypothesis for the most appropriate solution and testing it. Dewey calls the use of reflective thinking theory for educational purposes the problem-solving method. In the process of scientific problem solving, both induction and deduction are used together, but induction is the dominant one. In this way, Dewey laid the theoretical foundation for the application of the scientific method by educators. According to Dewey, the scientific problem-solving method includes the following stages:

1. A perceived difficulty

2. Identify and define this problem

3. Proposing hypotheses with possible solutions

4. Gather appropriate evidence, test hypotheses and answer appropriate questions.

When the table given above is analyzed, it is seen that there are different applications of problem solving for each discipline. These methods can also be applied to other disciplines. In other words, creative thinking method can be used in science as easily as it is used in psychology. Because they all try to solve an existing problem and find the best solution. Since the important thing is to eliminate an existing difficulty, using the most logical and appropriate method for the problem solver will facilitate the solution. In the problem-solving process, it is not correct to make a decision only by looking at the solution. Because the problem-solving process starts with the realization of the problem. Information about this problem is obtained, resources are consulted and data are collected. Problem solvers develop some hypotheses in the light of the available data and choose the qualified ones among them. Then, by deciding which is the best solution way, they reach the result, i.e. the solution of the problem. According to Robertson (2000), when students enter into the problem, they make a lot of guesses to solve the problem, especially for the solutions that arise in their minds. The first thing to do is to put the problem into long-term memory. As can be seen, in problem solving, only being interested in the result is a small part of the work done. The work started beforehand plays a big role in solving the problem.

This scheme, which can be described as the steps of problem solving, especially emphasizes the sequential following of the steps. Five steps play a vital role in recognizing the problem. When one of them is missing, the solution of the problem will be difficult. The diagram showing the problem recognition techniques proposed by Fogler & Leblanc (1995) is as follows:

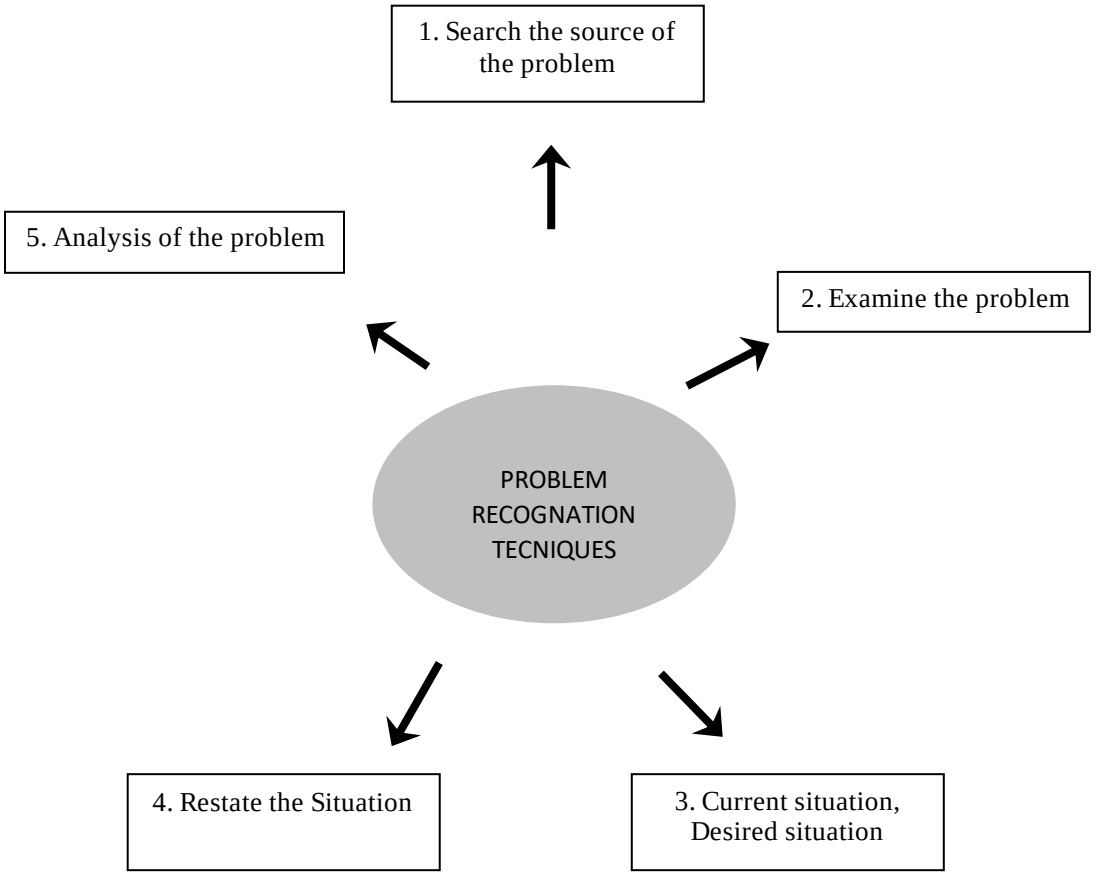

Figure 2. Problem identification techniques (Fogler & Leblanc, 1995).

The Duncker Diagram, which is located at the 3rd step in the problem recognition scheme whose steps are presented above, shows the situations that can be encountered in solving a problem and the ways that indicate how to act in the face of these situations. According to this diagram, there is no single solution to a problem and different methods should be followed in different situations (Fogler & Leblanc, 1995).

There are a few important points to be taken into consideration in guiding students while researching a problem. The first of these is to attract the students' interest and to create the necessary ground for them to investigate the problems in order to take ownership of the subject. Secondly, the problems should be problems that cover daily events that have not been previously posed in order to provide the desired results. The third important point is that the problems should be at a level that the students can realize, should not have a single correct answer and should be in a way to involve the students. The fourth point is that domain knowledge should not be at the level of seeing the results immediately but should be found through learning processes and methods based on students' real-life knowledge (Gale, 2000).

3.4. Competences Required in Problem Solving

Problem solving is a systematic process and therefore requires a specific skill. In order to develop students' problem-solving skills, attention should be paid to the following qualities:

To be successful in problem solving, it is necessary to have the following competences:

• **Understanding what you are watching**: Knowing whether one understands something or not. Evaluating a person's performance.

• **Understanding Decisions:** Understanding what a person does and the reasons for it.

• **Planning:** Taking time to develop a strategy, comparing ideas, being able to act without impulse.

• **Taking Difficult Tasks into Account:** Taking difficulties into account and organizing enough time for difficult problems.

• **Defining the Task:** Accepting the task, being alert to internal and external distractions, following one's way of thinking.

• **Identifying Strategies:** To be relaxed, to keep going when things are not going well, not to be discouraged and not to become disheartened

• **Internal cues:** Looking for cues in the content when faced with different and new problems.

• **Watching Again:** Looking at definitions, rereading previous information, knowing when to go back.

• **Taking Notes and Verifying:** Using logical approaches, double checking, identifying inconsistencies, recognizing performance deficiencies.

• **Flexible Approaches:** Being willing to use alternative approaches, using any other reasonable and logical approach when an original approach is not successful (Yaman, 2003).

It can be said that low achieving students have less metacognitive skills compared to high achieving students (Ornstein & Lasley, 2000).

Henningsen and Stein determined the features to be considered while solving problems as follows:

1. There should be real problems that reflect the purpose of schools,

2. Content, puzzles and applications should include situations that will attract students' interest,

3. There should be projects with multiple solution strategies, multiple presentations and multiple solutions,

4. It should contain rich opportunities related to the topic,

5. It should have content appropriate to students' prior knowledge and levels,

6. The difficulty level of the study topics should not be at a level that would discourage students (Erickson, 1999).

As stated in the problem statement, problem-based learning approach improves students' problem solving and creative thinking skills. Researchers who study problem solving theories consider creative thinking and problem-solving process together. Most of the scientists have considered the nature of creative thinking process as a special form of problem solving (Ochse, 1988). According to Sungur (1997), creativity is a problem-solving process. An individual's high level of problem-solving skills is closely related to having an advanced level of creative thinking. Therefore, in this study, it is thought that explaining the concepts of problem solving and creative thinking before giving theoretical information about problem-based learning will shed light on a better understanding of problem-based learning.

4. Conclusion

In conclusion, critical thinking and problem solving are essential skills that are necessary for success in both academic and professional settings. By honing these skills, individuals are able to analyze information, evaluate different perspectives, and come up with effective solutions to complex problems. These skills are not only valuable in the workplace, but also in everyday life, as they enable individuals to make informed decisions and navigate challenges effectively.

According to a study by the American Management Association, critical thinking and problem solving are among the top skills that employers look for in potential employees (AMA, 2012). This highlights the importance of developing and refining these skills in order to be competitive in the job market. Overall, critical thinking and problem solving are crucial skills that can lead to improved decision making, increased innovation, and overall success in various aspects of life. It is important for individuals to continuously practice and enhance these skills in order to thrive in today's complex and rapidly changing world.

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Chapter 10 - Communications

Aydan USTAOĞLU ÇELİK

Chapter Highlights

- In the 21st century, communication skills are critical for success in all areas of life.
- Today, it has become a necessity to use qualified and technologically equipped communication tools in order to realize educational goals.
- The use of Web 2.0 tools as well as online communication channels in social studies teaching positively supports course quality and student success.
- 21st century skills have strong and healthy communication at their core.
- The development of online learning tools and communication tools contributes to teacher-student and student-student interaction.

1. Introduction

The current century, as the age of information and technological development (Öcal & Bahar, 2024), is a period of rapid development, change and transformation, and the competences and skills expected from today's people are changing (Kurudayıoğlu & Kocaoğlu, 2021; Türel, Şimşek, Şengül Vautier, Güneş, Şimşek, & Kızıltepe, 2023). It is seen that these changing competence and skill sets are frequently explained as 21st century skills in the literature. 21st century skills are critical for students to be successful in future academic and professional life. Providing these skills to students will improve their competences such as solving complex problems, communicating effectively, working collaboratively, finding creative solutions and effective use of information technologies (Partnership for 21st Century Skills, 2007).

One of the most basic and indispensable skills expected from individuals and required to be developed in this century is communication skills (Chiruguru, 2020; Korucuk, 2022). Communication has an undeniable importance in our existence. Communication not only helps to exchange information and knowledge, but also helps to develop interpersonal connections. As a result, communication is of critical importance (Ghosh, 2022).

People with developed communication skills can overcome obstacles more easily, solve problems in a healthier way and are more successful in their professional lives (Dülger Ceylan & Atalar, 2018). In this context, it is seen that communication, which is so important in human life today, has developed in the face of the changing new world order and developing technology, and its importance in the field of education has gradually increased. Accordingly, in this section, the subject of communication will be discussed within the scope of social studies course (Demir & Özyurt, 2021), which is one of the effective courses in providing 21st century skills to students.

2. Communication Concept

It is seen that mankind has been trying to fulfil the need for communication, which can be shown among the most basic and oldest needs since the first day of its existence, through different ways in the historical process. Although the communication channels of the first people differ greatly from today's communication types, it is understood that communication has always been of vital importance throughout human history. Pictures and shapes drawn on cave walls, the use of smoke and birds, letters, telephone, TV and all kinds of activities carried out through the internet, which is indispensable in our age, are indicative of the steps taken by humanity to meet the need for communication (Süllü Durul, 2020; Şahin, 2019).

Communication, a word of Latin origin, is synonymous with the word "communication" and comes from the word "communis", that is, "common". Accordingly, concepts and symbols with common

meaning are needed for communication (Balcıoğlu & Ünlüoğlu, 2017; Uygun & Arıkan, 2019; Süllü Durul, 2020).

Communication, which is a necessity rather than a choice for individuals (Özerbaş, Bulut, & Usta, 2007) is the process of sharing information, thoughts, questions, ideas and solutions through a system of common symbols, signals or behaviors between people (Chiruguru, 2020; Ghosh, 2022). As a concept, communication is defined in the Current Turkish Dictionary of the Turkish Language Association (2024) as "the transfer of feelings, thoughts or information to others through any conceivable means; communication, communication, communication, communication; information exchange carried out by using tools such as telephone, telegraph, television, radio, etc.". According to Kılınç (2018), "Communication is an information transfer process between the source and the receiver, simultaneously or not; it is the transmission of messages or messages coded by the source to the receiver with the help of a suitable channel." Korucuk (2022) defines communication as "communication is the transfer of a message from a source to a receiver verbally, in written or unwritten form."

There are some elements that play a role in the communication process in order for communication to be maintained in a healthy way and for the process to achieve its purpose (Şahin, 2019). These elements in the communication process are in interaction with each other. Each element affects the other element and itself can be affected by other elements. In this context, it is important to be aware of the structure of the relevant process and the elements of communication in order to carry out an effective communication process (MEB, 2020). As communication is a process that includes many elements and elements, the healthy use of the relevant elements is important for the efficient and effective execution of the process. The three basic elements of communication are source, message and receiver (Balcıoğlu & Ünlüoğlu, 2017; Çolakoğlu, 2020; Korucuk, 2022; MEB, 2008; Şahin, 2019). In order for communication to be fully realized, the presence of these elements and knowing their characteristics can facilitate the understanding of the communication process (MEB, 2014; Kılınç, 2018).

In this direction, explaining the three basic elements will contribute to understanding the process. Firstly, the source in communication is the sender of the message or the initiator of the communication process. It is not possible to communicate without the sender, i.e. the source. It can be said that the most important responsibility in communication belongs to the sender (Çolakoğlu, 2020; MEB, 2008; MEB, 2014). A message is a stimulus prepared by the source for the receiver and sent to the receiver in order to change some thoughts, feelings, behaviors, etc. in the receiver. As the essence of interaction, the message is what is communicated during communication. It consists of verbal, visual and auditory symbols as a concrete product produced by the source (MEB, 2008;

Kılınç, 2018). The receiver is the person or persons who are the addressee of the message sent by the source and who are expected to experience behavioral change as a result of the message. The receiver (target), as the person to whom the message is intended to reach during communication, can also be explained as the person who is expected to perceive the message sent by the source and give an appropriate response to the message received (Güven, 2016; Öz, 2017).

Communication, which is defined as a way of conveying thoughts and ideas to other people, can basically be verbal or non-verbal. Both ways of communication are very important for conveying thoughts (Asrar, Tariq, & Rashid, 2018). However, with today's technological developments, it is known that communication through the internet has become widespread. It is seen that the use of the internet has become indispensable in social life, contributes to the universalization of information and communication. It has become possible to establish video, audio and written communication through the internet. When it is desired to communicate via the Internet, electronic mails, forums, social media, websites and various technological applications can be used. In this context, it is seen that virtual communication provides convenience and is actively used in business life, education and economic activities (MEB, 2020). Regardless of the type and way of communication, it has always been valuable to express thoughts clearly, to express ideas clearly, to motivate others through strong speech, in short, to communicate. In the 21st century, it is an undeniable fact that this skill, which has been transformed, has become even more important today (Rokeel, undated as cited in Chiruguru, 2020).

3. Communication as a 21st Century Skill and Its Place in Education

Today is rich in terms of technological developments and it is agreed that individuals should be able to solve problems, co-operate, communicate, acquire new skills and knowledge and adapt to rapidly changing conditions. This comprehensive set of cognitive and affective skills is generally called 21st century skills (Tünkler, 2022; Tünkler, 2023; Ünüvar, 2023).

In today's world where science and technological progress is developing rapidly, it is becoming increasingly important to raise qualified individuals who have 21st century skills and can keep up with the changing age. In general terms, these skills include affective characteristics that show richness and high-level thinking and learning skills that students are expected to develop in order to be successful in the age of science and technology (Ecevit & Kaptan, 2021).

The 21st century, as a century that is rapidly developing, changing and transforming with technological developments, shows itself in every aspect of our lives at individual or social level. Individuals need to become competent in 21st century skills in order to be able to exist and achieve success both in their business and social lives (Kurudayıoğlu & Kocaoğlu, 2021; Türel et al. 2023).

It is becoming more and more important to provide individuals with the skill set they will need for this century, which will enable them to adapt to change and prepare for social life (Tünkler, 2023; Türel et al. 2023).

In the new conditions shaped by scientific and technological developments, these skills, which are expected to be considered in the teaching process, are more in the direction of "problem solving, critical thinking, communication, cooperation, creativity and using information technologies". These skills, which facilitate the individual's adaptation to society, are also the skills that are expected to be taken into consideration in curricula (Öcal & Bahar, 2024).

21. century skills include basic skills; It includes three basic skill areas: "Life and Career Skills (Flexibility-adaptability, initiative-self-management, social and intercultural skills, productivity and accountability, leadership and responsibility), Information, Media and Technology Skills (Information literacy, media literacy, information, communication and technology (ICT) literacy), Learning and Innovation Skills (Creativity and innovation-innovation, critical thinking and problem solving, communication and collaboration)" (Partnership for 21st Century Skills, 2007; Trilling and Fadel, 2009; Mete, 2021; Levin-Goldberg, 2012; Yalçın, 2018).

As can be seen, the concept of communication, which constitutes the main subject of this section, appears as a skill that is directly emphasized both in "Information, Media and Technology Skills" and "Learning and Innovation Skills". When we look at how communication is addressed within the scope of Information, Media and Technology Skills; it is seen that communication skill is explained as "Using digital technologies (computer, PDA, media player, GPS, etc.), accessing communication/network tools and social networks appropriately" (Partnership for 21st Century Skills, 2007). The concept of communication, which is addressed within the scope of Learning and Innovation Skills; "critical thinking and problem solving, communication, collaboration, creativity and innovation" (4C: critical thinking and problem solving, communication, collaboration, creativity and innovation) is considered as a concept within the skill set commonly known as 4C (Levin-Goldberg, 2012). These 4C skills are seen as the keys that unlock lifelong learning and creative work as basic learning, knowledge and work skills (Trilling & Fadel, 2009).

Communication, one of the 4C skills, includes the ability to express thoughts clearly and persuasively both orally and in writing, to articulate ideas, to convey coherent instructions, and to motivate others through conversation (Joynes, Rossignoli, & Fenyiwa Amonoo-Kuofi, 2019, p.12).

According to Kalemkuş and Bulut Özek (2022), it is possible to interact with peers and field experts who use digital media and media through communication skills as one of the 4C skills, and to share information and ideas with many people or audiences through various information and

communication technologies. In addition, cultural understanding and awareness can be developed by communicating with individuals with different cultural identities.

On the other hand, communication and cooperation skills among learning and innovation skills are considered important in the updated-renewed curricula in Turkey (Gelen, 2017). When looking at the skills in the context of the curricula renewed by the Ministry of National Education, it is seen that the "communication" skill is evaluated in the category of competence and skills that are considered compulsory to be acquired in the social field by emphasizing that the expectations of the society for future generations have differentiated (Presidency of the Board of Education, 2017).

One of the most effective tools and methods to create a healthy society is communication. People who make up societies without communication are closed to innovations and modernity, uninformed, lack the power to comment and express what they think (Gönenç, 2007). In this direction, it is seen that education has a lot of work in the effective use of communication. So much so that "communication and education are two inseparable concepts today. The main reason for this is that the only way to realize educational goals is through communication" (Deryakulu, 1992).

Communication is an important part of education as it can enhance the learning experience and create a positive atmosphere in the classroom (Boonmoh & Kulavichian, 2024). It can be said that learning and teaching processes are basically equal processes with communication processes and a good communication style is a prerequisite for a good educational environment (Deryakulu, 1992). Without effective communication, which is considered a key element of education and learning-teaching processes (Tutkun, 2017), there is no way to do anything in the classroom or anywhere else. For this reason, communication is an indispensable skill of the 21st century (Chiruguru, 2020).

3.1. Social Sciences Teaching and Communication Skills

In addition to being a course that can be effective in providing 21st century skills to students, social studies course also has a key importance in developing related skills (Çakır, 2024; Demir & Özyurt, 2021; Öcal & Bahar, 2024; Tünkler, 2022; Tünkler, 2023). In this context, when the social studies course curricula are examined in terms of skills by years, it is seen that in 2005, 2018 and 2023, emphasis was placed on the acquisition of "communication" as a skill (Akbaba & Aksoy, 2019; Kılıçoğlu, 2019; MEB, 2023; Yıldırım & Çalışkan, 2024).

Communication skill, which is one of the skills of the social studies course curriculum, has been one of the skills that are emphasized both in terms of the specific objectives of the course and the achievements, and activities to develop this skill are included in the content of the course (Kılıçoğlu, 2019). In accordance with the General Objectives and Basic Principles of Turkish National Education as stated in the National Education Basic Law No. 1739, 18 specific objectives have been determined

in the Social Studies Curriculum. Two of these objectives are explained as "To use information and communication technologies consciously by comprehending the development process of science and technology and its effects on social life; to use basic communication skills and basic concepts and methods of social sciences in order to organize social relations and solve the problems encountered". In line with these specific aims, it is aimed to ensure that students acquire basic communication skills and be conscious when using communication technologies (Kılıçoğlu, 2019; MEB, 2018).

When the status of communication skill in the curricula according to years is examined, it is seen that there are 15 skills to be acquired in the 2005 Social Studies Curriculum, while communication skill is not addressed within the scope of social studies-specific skills and is expressed as one of the basic skills that are tried to be gained in other courses. However, in the 7th grade curriculum of the relevant year, it is seen that communication skill is included within the scope of the "Individual and Society" learning area as one of the skills associated with learning areas (Akbaba & Aksoy, 2019; Yıldırım & Çalışkan, 2024).

In the 2018 updated curricula, the competencies, which are the range of skills that will be needed by students in various fields, have been determined in accordance with the Turkish qualifications framework. It is seen that four of the 8 key competences expressed in the Turkish qualifications framework, namely "communication in mother tongue, communication in foreign languages, digital competence and cultural awareness-expression", refer to communication. When the 2018 Social Studies Curriculum is examined, it is understood that one of the 27 skills planned to be acquired in line with the Turkish Qualifications Framework is communication skill. In addition, it is seen that 7 of the 27 skills aimed to be acquired in the 2018 Social Studies Curriculum include the concept of literacy. In this context, it is thought that media literacy and digital literacy can be considered as types of literacy that include communication-related competencies (Akbaba & Aksoy, 2019; MEB, 2018; Yıldırım & Çalışkan, 2024). Finally, when the Social Studies Curriculum for the year 2023 is examined, it is seen that there are 27 skills to be acquired similar to the 2018 curriculum and one of these skills is communication skill (MEB, 2023). Based on these results, it can be said that communication skill has found a place in the curricula by maintaining its importance and improving its scope with each renewed curriculum.

4. Use of Technology Within the Scope of Communication Skills

There are numerous pedagogical strategies that educators can use to integrate the 4Cs - "critical thinking and problem solving, communication, collaboration, creativity and innovation" - into their curriculum and instruction. In developing 21st century skills, it is necessary to utilize technology to create a richer learning environment (Levin-Goldberg, 2012). Technology and digital environments and tools facilitate adaptation to the skills-based characteristics of the 21st century. In

the rapidly changing digital age, learning and development, success in professional life, use of new media technologies and advanced communication skills are required (Yazıcı, 2023).

Communication skills refer to the organization of data, findings and thoughts acquired by students and their effective oral and written sharing through various media (Ersoy, 2022). Communication skills (verbal, written, non-verbal communication and listening skills) are considered as a gateway to the development of other skills (Joynes, Rossignoli, & Fenyiwa Amonoo-Kuofi, 2019).

In this context, it is considered important for individuals to communicate clearly and understandably through the use of different resources and to make technology, which is effective in almost every field including education, a part of their lives (Eker & Kurum, 2021). In fact, while education has always been concerned with the basics of good communication (speaking accurately, reading fluently, and writing clearly), digital tools and the demands of our time require a much broader and deeper portfolio of personal communication and collaboration skills to promote collaborative learning (Trilling & Fadel, 2009).

Communication skills are also embedded in information, media and ICT competences. Given that it is highly valued in the workplace and in public life and that a large proportion of messages are transmitted by one or more digital devices, 21st century technological developments have triggered radical changes in the way people interact and communicate with each other and with society. These dramatic changes, on the other hand, provide the opportunity to use written, audio and video communication types with many features through highly interactive media (Yazıcı, 2023). Communication skills continue to be shaped by current and emerging technologies (Joynes, Rossignoli, & Fenyiwa Amonoo-Kuofi, 2019).

Today, it is seen that the applications and devices invented with the support of technology in order to establish communication, which is indispensable for human beings, have made communication much more comfortable and easier by entering our lives (Şahin, 2019). In this context, e-mail, forums, social media, websites and various applications are used in communication via the internet, which makes it possible to establish video, audio and written communication (MEB, 2020). Talking with people thousands of kilometers away by making video calls, sharing photos and special memories, meeting new people even in the other corner of the world has become a simple, easy action performed with a fingertip (Şahin, 2019). In addition, with the introduction of the Internet into our lives, "electronic encyclopedias, dictionaries, digital private and public libraries, digital books, articles and archives, social networks, blogs and web pages, discussion forums offered as web products" are as close as a click (Taşkıran, 2017).

While the rapid change in technology has led to major changes in the way of thinking, speaking and

learning abilities, ways of communicating and establishing relationships (Yazıcı, 2023), it is seen that the educational environment has also been affected. So much so that when the changes in the field of education are analyzed in terms of communication, it has become possible for students to communicate with each other through the use of blogs, e-mails, wikis and other online tools that help them share their work and progress (Levin-Goldberg, 2012), reach experts via e-mail, send text messages to learning partners (Trilling & Fadel, 2009) in order to successfully complete their homework. The face-to-face communication established by traditional methods in the educational environment has been replaced by a technology-supported communication style in which web 2.0 tools are frequently used.

5. Communication Through the Use of Web 2.0 Tools

"Web 2.0" is a concept introduced by Tim O'Relly in 2004. This technology, which defines various websites and applications that allow everyone to create and share applications, supports users to be active not only through reading, watching and listening skills but also through cooperation, communication and interaction (Aydın, 2018; Durmuş, 2015; Kavasoğlu, 2020). Through Web 2.0 technologies, it has become possible for users to contribute to the content, make comments or convey their thoughts on developments to other users (Koçyiğit & Koçyiğit, 2018). The main purpose of Web 2.0 application tools and services is to enable users to share content easily without facing any technical obstacles and to reveal their potential for co-operation with social interaction (Kavasoğlu, 2020). As the first used Web 1.0 technologies, radio, television, e-mail, discussion forums, etc., while users were able to communicate in some way, they were deprived of effective interaction and co-operation. In this context, users using these tools were seen as passive consumers. However, it is seen that users have achieved an active status through Web 2.0 tools developed to provide more effective interaction and co-operation (Darwish & Lakhtaria, 2011).

These Web 2.0 technology services, which express online collaboration and sharing, enable different users to create sharing areas (Genç, 2010). Tools developed in various ways to provide opportunities such as communicating, sharing experiences, and blogging attract the attention of users (Aydın, 2018). There are many different Web 2.0 applications with social media, wikis, blogs and social networks (Kavasoğlu, 2020). As other innovations offered by this technology, "weblogs, podcasts and videocasts, bookmarks, tagging, photo and video sharing, mashups" are other prominent applications (Genç, 2010). These developed tools tell participants to "share, collaborate and communicate". In this context, it is seen that today, the relevant technology and the tools developed based on it have become the easiest and most popular way to transmit information (Kavasoğlu, 2020). It is seen that the innovations brought by such popular tools and applications find an echo in the field of education and shape communication, which is indispensable for education. Web 2.0 tools offer

unique, hitherto impossible opportunities to change the teaching process and the nature of learning experiences (Konstantinidis, Theodosiadou, & Pappos, 2013). Within the scope of the innovations resulting from Web 2.0, students are expected to participate in learning processes as a productive individual in daily life and today's education and learning environments. In addition, it is important for students to be in interactive learning environments and to be in a two-way communication through the 2nd generation web tools that end the time and space restrictions (Atalmış & Şimşek, 2022; Filiz & Ceylan, 2022).

Today, Web 2.0. tools are used for different purposes in various fields of education. When a general classification is made, the areas of use of Web 2.0. tools in education can be listed as follows: "Assessment and Evaluation Tools, Map Tools, Virtual Reality Tools, Dashboard Tools, Classroom and Content Management Tools, Presentation Tools, Infographic Tools, Foreign Language Tools, Social Network Tools, Cartoon Tools" (Kırımlı & Demirezen, 2022). It is seen that Web 2.0 technologies offer many conveniences and opportunities for educators and students, who constitute another pillar of the education system. It has become possible for educators to establish a more effective learning environment and create an effective communication space with little technical knowledge. For example, learning managements such as Edmodo and Beyazpano, new generation presentation applications such as Canva, Prezi, blogs that can be used to share with students, or tools such as Gmail Drive, Google Forms, Skype, Google Meet, Zoom, Microsoft Teams, which can be used to get students' opinions on a subject and communicate can be included in this scope (Durmuş, 2015).

When we look at the contributions of Web 2.0 technologies in the context of courses, it is seen that it is possible for students to gain many of the subjects within the scope of the Social Studies Curriculum with the help of the relevant technology due to its multidisciplinary content (Özcan, 2021). Using Web 2.0 tools in social studies teaching for course quality and student success is important in the 21st century education approach. It is known how important the use of technology in the social studies course is from both teacher and student perspectives. In this direction, the use of Web 2.0 tools, which are among the most basic tools that should be used to integrate technology into this course, gains importance (Tünkler, 2021; Tünkler, 2022; Yıldırım, Tanrıkulu, & Ablak, 2022).

6. Conclusion

It has never been as easy as it is today for individuals to communicate and interact with each other regardless of time and space. Although this convenience does not mean that all borders have been removed to communicate in the world, it is seen that the existing borders are rapidly decreasing with the introduction of technology and various communication tools into our lives. Education has taken its share from the technological developments. Unfortunately, educational materials and forms

of communication, which were accepted in the past, are now inadequate for students who want to see more than paper and pencil studies in their educational experiences and who are used to technological means of communication.

It is unacceptable in today's conditions that the social studies course, whose main goal is to raise good people and effective citizens, is a course that is closed to communication and distant from technology within the scope of 21st century skills. Especially the fact that social studies teaching is based on various social science disciplines diversifies the technological tools and communication methods to be used in educational practices. In this context, it is thought that technological developments, especially Web 2.0 tools, can be easily benefited from technological developments at the point of gaining and using the communication skill, which is one of the 4C skills that constitute the core of this section, in the social studies course.

Application Example

Communications-Based Sample Activity Plan

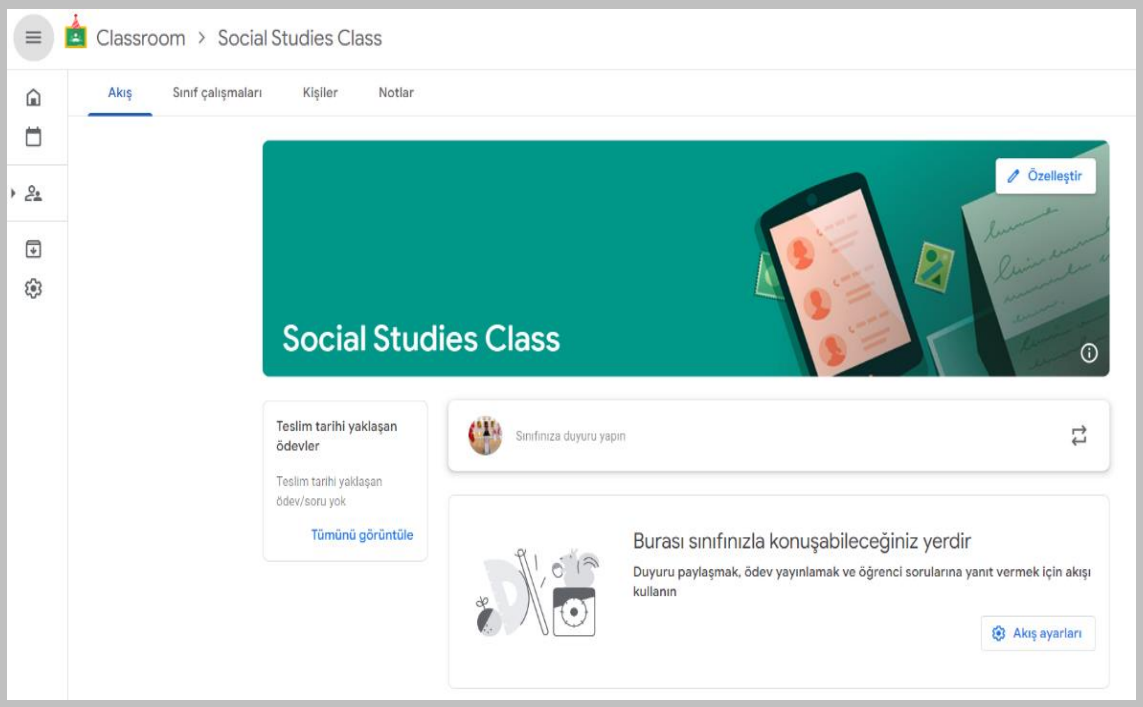
Course Title: Social Studies
Class: 4
Subject: Children's games
Recommended duration 40 minutes
Gain and Indicators: Compares traditional children's games with today's games in terms of change and continuity.
Skills Communication, Collaboration
Environment: Google Classroom, Google Drive, Google Forms, Canva, Prezi

Preparation for the Event

Duration: 10 minutes

The teacher creates a virtual classroom via "Google Classroom" and enrols students.

After ensuring student participation, the students are asked when they last played a game.



Implementation of the Activity

Duration: 25 Minutes

Application Phase I

Students are asked to prepare a poster introducing a children's game using "Canva".

Instruction

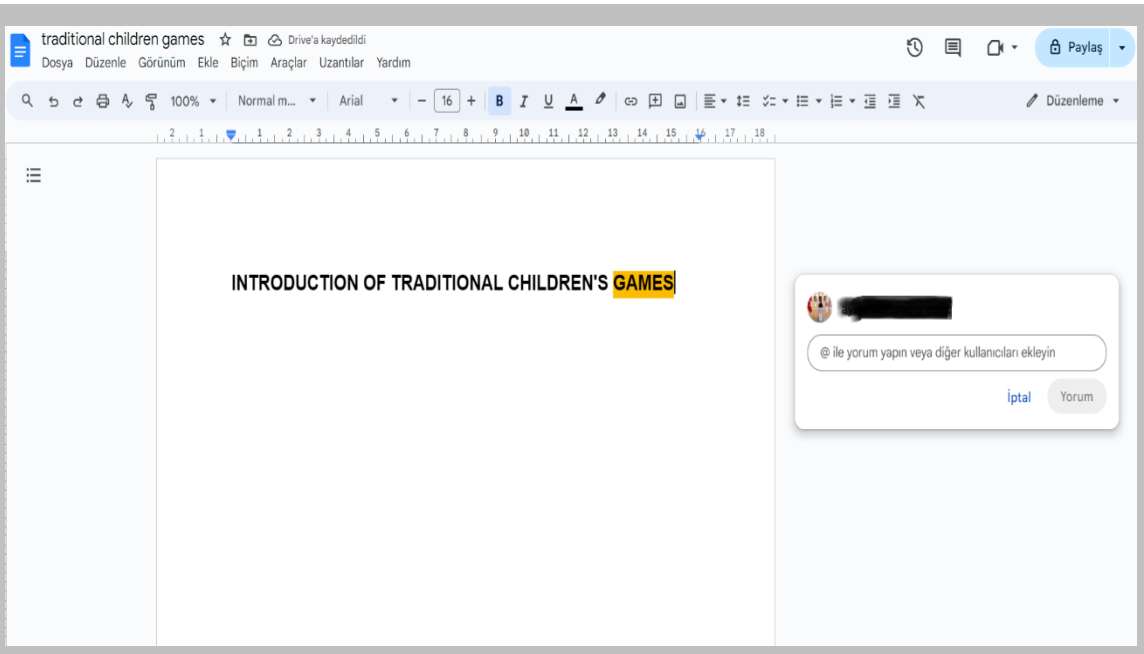
Dear students, you are asked to design a new children's game and prepare a poster introducing your game. In this process, while introducing your game, you are expected to explain the tools used in the game, the place and time the game is played, the reward-punishment etc. in the game. It is important that you include pictures or drawings in your poster describing how the game is played and explaining its stages.

Application Phase II

Students are divided into two groups. The 1st group is given the subject of traditional children's games and the 2nd group is given the subject of contemporary children's games. Each group is asked to write a report on the topics by using "Google Drive". In addition, the groups are asked to prepare an informative presentation using "Prezi" with sample children's games.

Instruction

Dear students; you are asked to write a joint report with your group mates on the topic that has been notified to you. In your report, you can include information about the definition of the game, its importance, its contribution to development, the status of traditional children's games, the change of children's games played today, etc.



Then you are expected to prepare a presentation in accordance with your topic. Include at least 5 game types in your presentation. Do not forget to add instructive, introductory videos about the games.

Evaluation of the Event

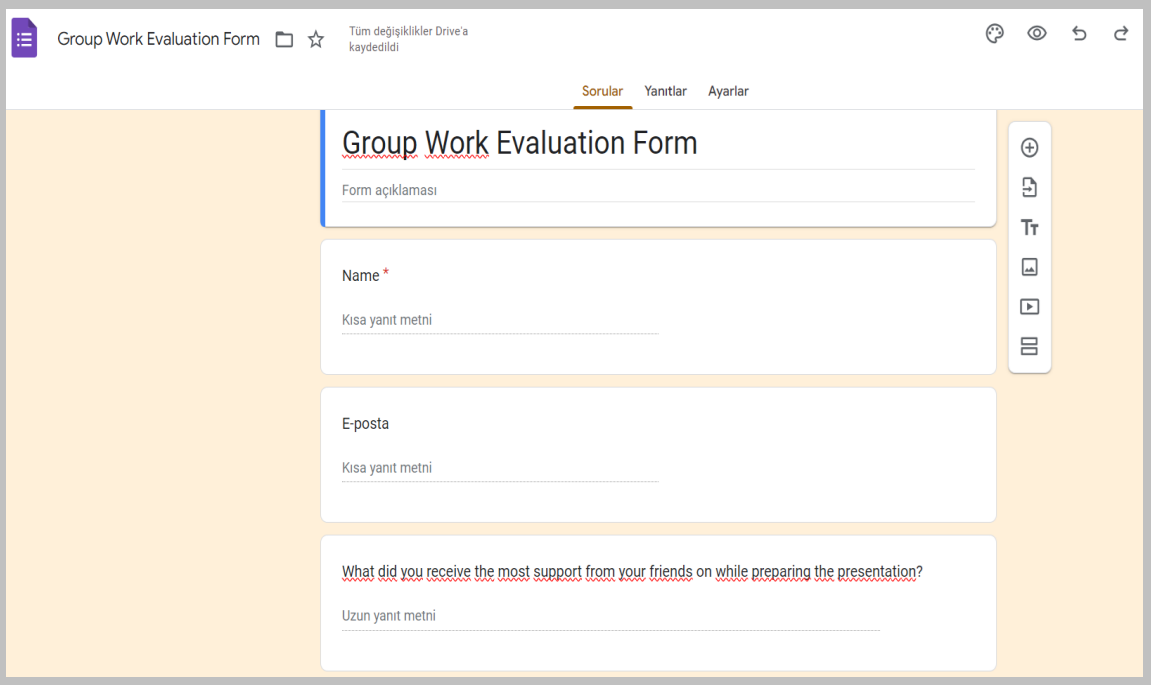
Duration: 5 Minutes

The feedback questionnaire prepared through "Google forms" is shared in order to determine the students' evaluations regarding their ability to communicate and co-operate during the presentation and report preparation process.

Sample survey questions:

"Which group member did you communicate with more during the report writing process?

"In which subject did you get the most support from your friends during the preparation of the presentation?"



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Chapter 11 – Collaboration Skills

Çiğdem KOZANER

Chapter Highlights

- The development of collaboration skills, recognized as one of the core learning and innovation skills of the 21st century, has become an imperative for individuals in contemporary society.
- The effective integration of collaboration skills into educational processes significantly influences the advancement of both individuals and institutions.
- The collaboration skill, which is also included in the social studies curriculum, plays an important role in helping individuals understand the fundamental dynamics of social life and actively participate in it.
- Collaborative learning in education is a learning approach in which individuals are responsible for their own learning processes while also respecting the abilities and contributions of their peers.
- The use of information technologies for lesson delivery and support offers new opportunities for collaborative learning. Information and Communication Technologies (ICT) in education bring about significant changes in the way we work and learn.
- Online document sharing and editing platforms, along with other Web 2.0 tools, can be effectively utilized to facilitate students' collaborative work, as they are easily accessible and streamline the collaboration process.
- The rapid development of digital technologies and online learning tools provides students with opportunities to work in groups and supports the development of their collaborative skills.

1. Introduction

The primary goal of education is to prepare students in a way that enables them to contribute to both the business world and society. This objective stands as one of the greatest challenges of the 21st century. In fact, solving the major problems of our time, such as preventing global warming, treating diseases, and ending poverty, is not possible without an education system that prepares each individual to take an active role in solving common problems (Trilling & Fadel, 2009). At the same time, the emergence of digital technologies in the 21st century, the development of new tools for interaction among people, and increasing international competition have led organizations to demand new skills from their employees. Education systems are struggling to provide adequate and continuous training to meet these new demands (Thornhill-Miller et al., 2023). The information and knowledge-based global society of the Digital Age has created the need to define and identify the 21st-century skills that citizens must possess. Educators and policymakers have analyzed how these skills can be applied in educational and work environments and what the expectations are. Various frameworks for these skills, essential for success during this period of rapid transformation, have been developed (ATC21S (Assessment and Teaching of 21st Century Skills), OECD Framework, NRC Framework (National Research Council), NCREL (The North Central Regional Educational Laboratory), UNESCO, P21 Framework) and are continuously being revised (Deniz & Büyükalan Filiz, 2022; Mawas & Muntean, 2018; Sanabria & Arámburo-Lizárraga, 2017). Learning and innovation skills are what separate students who are prepared for the increasingly complex life and work environments of today's world from those who are unprepared. These skills include Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration (Partnership for 21st Century Skills, 2019). The focus of this section is on collaboration skills. Education has traditionally focused on the fundamentals of good communication skills, such as proper speaking, fluent reading, and clear writing. However, with the impact of digital tools and today's demands, it is now necessary to develop a broader and deeper portfolio of individual communication and collaboration skills and promote learning together (Trilling & Fadel, 2009).

The rapid development of technology and the changing needs of students require educators to adopt innovative methods in their teaching strategies. In this context, teachers who move away from traditional teaching methods are seeking new ways to personalize learning processes and integrate contemporary technologies. Educators aim to engage students and make learning experiences more effective by using modern digital tools and platforms. These innovative approaches make educational processes more dynamic and interactive, while also contributing to the creation of student-centered learning environments.

It has been proven that face-to-face and online virtual collaborations increase learning motivation, produce more innovative and superior results, and also develop social and intercultural skills. The process of learning within a community of learners, where knowledge, questions, skills, progress and motivation for the topic are shared, is similar to the way adults learn when they participate in work and professional communities of practice. Today, there is a wide range of online communication tools and environments that support social, collaborative and community-based learning approaches. Thanks to the global nature of the Internet, students can now become global learners by connecting with people in every corner of the world (Trilling & Fadel, 2009).

2. The Concept of Collaboration

The term "collaboration" is derived from the two Latin words com (together) and labore (to work), and is thus defined as working together (Brookes, 2007, as cited in Kesim & Kayhan, 2022). As a concept, it gained prominence in the 19th century with the rise of more complex organizations and the increasing division of labor and tasks, driven by the acceleration of industrialization (Wanna, 2008). Collaboration is a subject studied across various fields; areas such as business and state administration (Kesim & Kayhan, 2022), health (Köse, Güner & Gevrek, 2021), education (Bolat, 1996; Tünkler, 2020), engineering and design (Türkyılmaz & Aytuğ, 2020), technology and computing (Gencer & Kayacan, 2017), and community and social services (Birinci, 2020) focus on different aspects and applications of collaboration. Therefore, the development and implementation of collaborative skills directly influence success and efficiency in these disciplines.

Collaboration is defined as the activity of working together towards a common goal and there are several elements in this definition. The first element is communication, with the aim of ensuring that the exchange of information and views is understood by a recipient. This element is a necessary but not sufficient condition for collaboration problem solving, since communication must go beyond a simple exchange. The second element is collaboration, in which a division of labor is first agreed upon. An alternative view might see co-operation as a lower-level version of collaboration but does not recognize it as a component. The third element is responsiveness, which implies active and receptive participation (Hesse et al., 2015). Collaboration is generally perceived as positive. Collaborating is often seen as better, more creative, transformative, and producing beneficial outcomes. However, different dimensions of collaboration should also be considered. Collaboration can be done for "good" purposes as well as for "bad" purposes. Therefore, the context in which collaboration occurs is important. The reasons for collaboration, the motivations of the actors, the aims, tools and practices, and the intended outcomes should be taken into consideration (Wanna, 2008). In this context, collaboration skills stands out as the key to efficiency across various disciplines. The effective use of these skills in educational processes will have an impact on the

development of individuals and institutions. One of the primary goals of education is to equip students with the knowledge and competencies required for their future professional roles. In this regard, it is essential to align educational curricula and teaching methods with developments and practices in the business world. In today's dynamic and technology-oriented business environment, graduates need not only academic knowledge but also thinking skills and the ability to collaborate.

3. Collaboration Skills in Education

Current education systems are inadequate in providing students with career opportunities and equipping them with the necessary competencies. Educational institutions have found that students, as well as the business and industrial sectors, are not satisfied with the current education standards. The education system lacks in equipping students with broader competencies, and it is observed that teachers do not place sufficient emphasis on skills-based education in their lessons. Insufficient time allocated to the curriculum and strict controls by educational authorities that emphasize only reading and counting are considered to be the biggest obstacles for teachers in teaching 21st century skills (Wrahatnola & Munoto, 2018). Education experts increasingly agree that education systems should not only provide students with solid academic knowledge, but also focus more on equipping them with a broad range of competencies, such as "learning how to learn" and "collaborative problem-solving." To develop these skills and offer a holistic education, teaching and learning experiences need to be restructured to include more experiential, engaging, and real-world academic learning applications (Winthrop et al., 2021). Personalization, collaboration, communication, informal learning, productivity, and content creation are not only competencies and skills that students need to develop, but also form the foundation of teaching methods (Scott, 2015). These skills play a crucial role not only in achieving academic success but also in their future professional and personal lives. There are various skill frameworks that define the different competencies considered important in the 21st century. These frameworks comprehensively address the knowledge, abilities, and attitudes necessary for individuals to succeed in today's world. Skills such as critical thinking, problem solving, digital literacy, collaboration, and communication are among the key elements highlighted in these frameworks. The Organisation for Economic Co-operation and Development (OECD) has classified the core competencies needed for individuals to develop 21st-century skills and promote lifelong learning into three main categories: interacting with socially heterogeneous groups, acting autonomously, and using tools interactively. Particularly in pluralistic and multicultural societies, interacting with socially heterogeneous groups holds great importance (as cited in Mavas & Muntean, 2018).

UNESCO (2020), in its report focusing on 21st-century educational skills, emphasized the need for cooperation, especially to tackle global challenges. Working together in harmony, achieving

common goals, and integrating different perspectives are necessary to protect our planet and solve societal problems. Cooperation fosters empathy and understanding. Thus, schools must instruct young people on how to collaborate effectively.

Collaboration is the joint effort of two or more individuals working together to complete a project, create a product, or solve a problem. When people collaborate, they establish a goal-oriented and purposeful relationship in which each participant contributes equally. Collaboration in schools may involve teachers working together to prepare lesson plans, develop curricula, engage in team teaching, conduct peer coaching, or adapt instruction for a specific student (Nolet & Tindal, 1994). Collaboration, as one of the most critical competencies of the 21st century, emerges as an indispensable element in education for developing students' teamwork, communication, and problem-solving skills.

Collaboration is a philosophy of interaction and lifestyle in which individuals are both responsible for their own learning processes and respect the abilities and contributions of their peers. In any situation where people gather in groups, this philosophy recommends an approach that respects and highlights the individual talents and contributions of group members. This fosters an attitude where people value each other's skills and contributions when working together. There is a sharing of authority and acceptance of responsibility among group members for the actions of the group (Laal & Ghodsi, 2012; Laal, 2013).

Many researchers have emphasized the positive effects of social interaction on individuals' learning processes and suggested that placing students in a social context is a fundamental strategy for developing complex cognitive skills (Glaser, 1992; Vygotsky, 1986; Wittrock, 1989, as cited in Scoular, 2021). Solving complex and interdisciplinary problems requires the development of collaborative skills. These skills are critical for contributing to the advancement of society and achieving educational goals. The ability to collaborate promotes understanding of alternative points of view, enabling individuals to benefit from a variety of perspectives. In addition, the experiences gained in the collaborative process allow learners to acquire a broader set of skills, which in turn contributes to the development of industry and the economy (Piniuta, 2019). In this context, cooperation skill offers important gains at both individual and social levels.

Collaboration and teamwork have become one of the inevitable requirements of the 21st century and a trend that has gained importance in almost every field. The needs for education in today's societies include collective thinking and the ability to work together for common benefits and goals. Collaborative learning stands out as an important educational method in teaching and learning processes. This method involves learning groups and teams coming together to solve various problems. In the collaborative learning process, it is aimed that learners find solutions to the problems

they face, complete tasks and create joint products. In this process, learners exchange ideas with their peers and have the opportunity to make comparisons, draw contrasts, and present and defend different ideas. Thus, they can raise critical questions and actively engage with other individuals' theoretical and conceptual frameworks (Riaz ve Din, 2023). This process goes beyond regulation, as group members co-organize their motivation, emotions and cognition and take on the requirements of the learning task with a shared responsibility (Järvenoja & Järvelä, 2009). Research examining the effects of students exchanging ideas with their peers on their learning processes indicates that when students become aware that their peers possess a higher level of knowledge, this awareness enhances their motivation and engagement in learning (Neugebauer, Ray, & Saasenberg, 2016) they engage in more critical thinking and have more in-depth discussions through peer learning. Furthermore, technology plays a pivotal role in facilitating this process (Ng, 2008). In this context, collaboration skills contribute to individuals to be better equipped in terms of both academic and social competencies. Social interaction provides students with an important contribution to developing problem solving skills. These interactions enable knowledge and meaning to be created together through collaborative learning processes.

4. Collaborative Learning

Approaches based on rote memorization and that do not encourage creativity hinder students from achieving higher-level learning goals. Therefore, innovative approaches need to be adopted to solve the problems encountered in education. One of the most widely used methods in students' learning processes is collaborative learning. Collaborative learning is used in the literature as “Collaborative Learning”, “Work Group”, “Collective Learning”, “Peer Learning”, “Team Learning”, “Teamwork”, “Study Circles”, “Study Group”, “Peer Teaching” (Bayrakçelen, Doymuş & Doğan, 2015). Cooperative learning is a structured working process based on social skills, personal responsibility and mutual commitment in which students work together in small groups to achieve common goals (Dirik, 2015). Research shows that cooperative learning is effective in both academic achievement and social skills of students (Arısoy & Tarım, 2013; Genç, 2007; Genç & Şahin, 2015; Yıldız & Bümen, 2013).

Collaborative learning cannot be achieved merely by dividing students into groups or giving them group assignments. It is also not enough for students to discuss with each other or help one another.

For the collaborative learning method to achieve its goals, the groups must be structured. The collaborative learning process can be explained as follows (Johnson, Johnson & Holubec, 2016):

1.Preparation and Planning

- The teacher should set clear and explicit objectives for each lesson.

• They must decide on the group size and select a method for assigning students to groups.

• The teacher should also define the roles to be assigned to group members and organize the classroom environment accordingly.

• They should prepare the materials that students will need throughout the lesson.

2. Collaborative Structure and Task Descriptions

• At the beginning of each lesson, the teacher should explain the academic tasks to the students.

• They must communicate the success criteria and structure positive interdependence.

• The teacher should clarify individual responsibilities and provide guidance on the expected behaviors throughout the lesson.

3. Monitoring and Intervention During the Lesson

• The teacher should closely monitor each learning group while conducting the lesson.

• The teacher should intervene when necessary to improve group work and tasks.

• At the end of the lesson, teacher should evaluate the process by ending the lesson.

4. Evaluation and Process

• The teacher should conduct quantitative and qualitative assessment of student achievement.

• Carefully monitor and evaluate the effectiveness of learning groups.

• Guide students in making the necessary plans to improve their own achievement.

Effective implementation of the collaborative learning model requires teachers to adopt a careful and systematic approach to planning, monitoring, intervention and evaluation. This holistic approach makes practical applications more functional.

Effective implementation of the collaborative learning model requires teachers to adopt a careful and systematic approach to planning, monitoring, intervention and evaluation. This holistic approach makes practical applications more functional. The key characteristics of collaborative learning are as follows:

Positive interdependence. It is one of the key components of cooperative learning. When positive interdependence is established, it encourages group members to work and support each other based on the success of the group. When students present a group or project in class, they are appreciated

when they show how each member's contribution comes together as a whole and how the group goal is achieved.

Individual responsibility. It is important for students to understand that they will be held responsible for their individual contributions to group work. This includes understanding that each individual must contribute to the group work. It signifies that every student is responsible for their own performance and is aware that their contributions are crucial to the success of the group.

Face-to-face interaction. It refers to group members encouraging, supporting and helping each other to make learning more effective and efficient. Group members engage in face-to-face discussions, exchanging ideas to find solutions to the problems they encounter. Thus, students who excel in a subject take on a teaching role for the other members of the group, benefiting both themselves and the others. These interactions arise from students working closely together, allowing them to develop the ability to read body language, which is crucial for forming personal connections.

Interpersonal and small group work skills.

Students should be taught effective communication skills, such as expressing their ideas, acknowledging the contributions of others, handling disagreements, and managing conflicts. In addition, they should be guided on fair resource sharing, taking turns, and participating in democratic decision-making processes. For the efficiency of group work, group members need to be taught leadership, decision-making, effective communication and conflict resolution skills. The collaborative learning approach differs from other teaching methods by providing students with these social skills.

Group processing. It is the process where students evaluate and discuss during and after group work what strategies they used to manage their learning process and achieve their goals and how they achieved their goals. It encourages students to ask metacognitive questions such as: "How are we doing?", "What else do we need to do?", "What could we have done differently?" This process promotes the evaluation of group members' roles in order to identify decisions that need to be made to improve the group's functioning and enhance members' contributions (Bayrakçeken et al., 2015; Efe et al., 2008; Gillies, 2007).

These features make cooperative learning, which provides the acquisition of collaboration skills, one of the 21st century skills, different from other teaching methods and offers students a comprehensive development both academically and socially. In the cooperative learning model, certain methods and techniques are used. These techniques include Learning Together, Team-Game-Tournament, Student Teams Achievement Divisions (STAD), Cooperative Integrated Reading and Composition (CIRC), Pairs for In-depth Study, Participating in Discussions in Neighboring Groups, Team-Assisted

Individualization (TAI), Participation Project, Structured Academic Controversy (SAC), Jigsaw, and Participation Project (Bayrakçelen et al.,2015; Johnson et al.,2016). These techniques are used based on the number of students, classroom organization, and the learning outcomes of the lesson. In today's, due to advancements in information and communication technologies, it is necessary to create flexible and adaptable learning activities aimed at equipping students with 21st-century skills, which are suited to the needs of the information age, rather than traditional classroom environments.

5. Collaboration Skills in Social Studies Course

Social studies is a curriculum that integrates and uses the knowledge and methods obtained from social sciences and humanities and aims to raise citizens who can make informed decisions and solve problems effectively in rapidly changing country and world conditions (Öztürk, 2012; Tünkler, 2023). For the purpose of achieving this goal, it is necessary for the course to not only provide theoretical knowledge but also provide students with skills such as problem solving, critical thinking, communication, and collaboration. In this context, students' ability to apply their knowledge to real world problems is a critical element that emphasizes the importance of skills teaching in social studies.

The social studies curriculum was first implemented in 1968 and then restructured with various changes and developments in 1998, 2005, 2017 and 2018. Changes and developments in the Turkish education system have affected the social studies course as in other courses. In accordance with each new approach, sometimes progress has been made and sometimes only changes have been made. (Kalaycı & Baysal, 2020). In 2024, the social studies curriculum was revised and updated to equip individuals with the necessary skills for addressing social issues, considering the changing conditions.

In Türkiye, skill instruction was incorporated into the social studies and other curricula in 2005. Skills are the abilities designed to be acquired, developed, and transferred to real-life contexts by students throughout the learning process. These skills are *Critical Thinking Skill, Creative Thinking Skill, Communication Skill, Research Skill, Decision Making Skill, Using Information Technologies Skill, Entrepreneurship Skill, Using Turkish Correctly, Beautifully and Effectively Skill, Observation Skill, Spatial Perception Skill, Perception of Time and Chronology Skill, Change and Continuity Perception Skill, Social Participation Skill,* and *Empathy Skill* (MEB, 2005). It is observed that the number of skills in the 2018 Social Studies curriculum has increased. Skills such as Environmental Literacy, Digital Literacy, Financial Literacy, Map Literacy, Collaboration, Use of Evidence, Location Analysis, Media Literacy, Self-Regulation, Political Literacy, Drawing and Interpreting Tables, Graphs, and Diagrams, and Innovative Thinking have been incorporated into the curriculum (MEB, 2018). In the 2024 Social Studies curriculum, skills are categorized under five main headings:

Conceptual Skills, Field Skills, Social-Emotional Learning Skills, and Literacy Skills (MEB, 2023). Collaboration skills were included in the Social Studies curriculum in 2018 and have been classified under Social-Emotional Learning Skills in the 2024 curriculum.

Social studies teaching aims to develop the study, thinking, interpersonal, and group skills necessary for effective democratic citizenship. In this context, it focuses on objectives such as:

• Working in large and small groups like teams, committees, and activity groups

• Showing respect for others and being sensitive to their emotions and needs

• Group planning, discussion, evaluation, role-taking, problem-solving, and decision-making

• Taking on roles as leaders and followers, participating in the formation of group standards and decisions, and taking responsibility in implementation (Öztürk, 2012).

The Social Studies course is a subject with content suitable for fostering social identity (Karasu Avcı & İbret, 2018). The collaboration skill, which is one of the 21st-century skills included in the Social Studies curriculum, is important for understanding the fundamental dynamics of social life and ensuring effective participation. The development and sustainability of societies depend on individuals' ability to work together. In this context, collaboration skills are important for individuals to take on different roles within the community, communicate effectively with others to achieve common goals, and actively participate in decision-making processes. Emphasizing cooperation skills in the social studies course aims to raise individuals as responsible citizens by contributing to their social and emotional learning processes. Within the scope of this course, students acquire essential competencies such as demonstrating an understanding of and respect for diverse perspectives, and collaborating towards common goals through group work and joint projects. In this way, collaboration skills contribute both to students' personal development and to strengthening social cohesion. In our era, where technology has significant impacts on all aspects of society, the integration of educational methods and techniques with technology has become a necessity. It can be said that the concept of computer-assisted education has given way to technology-supported learning environments.

Tablet computers, the internet, and Web 2.0 tools are making an increasingly significant contribution to educational processes (Baysan, Bayra & Demirkan, 2018). Technology provides social studies teachers with crucial competencies in creating student-centered learning environments and fostering 21st-century skills (Kormos, 2019; Tünkler, 2021a). At the same time, social studies is a content area that can achieve significant gains through the integration of technology into teaching and learning practices (Holcomb & Beal, 2010; Tünkler, 2021b, 2022). The National Council for the Social

Studies (NCSS, 2013) in the United States emphasized that the use of technology provides students with opportunities to restructure their knowledge, acquire new skills, and shift perspectives. Additionally, it highlighted the importance of students' participation in this process both individually under the guidance of teachers and collaboratively. The integration of technology in education enhances the effectiveness of collaborative learning, making it more flexible and accessible through new tools and platforms provided by technology.

6. The Use of Technology in the Context of Collaboration Skills

The use of technology in teaching and learning processes offers various advantages. Technology facilitates the teaching process, particularly by supporting collaborative learning, enabling the sharing of knowledge and experiences, and fostering communication among stakeholders (Günüç, 2017). The development of the internet, mobile, and wireless technologies is transforming the educational environment from traditional classroom instruction into a structure based on collaborative learning with individual adaptability. Therefore, it is essential to develop new approaches, taking into account these innovative Technologies (Okamoto, 2004). Different interpretations of the concept of collaboration allow teachers and students to determine the most effective ways to develop the collaboration and communication skills necessary for learning and working in the 21st century. While the definition of collaborative learning proposed by educators in the 20th century focused on students coming together in class to discuss a topic or problem, the contemporary concept of collaborative learning also includes the relevant collaboration skills, such as the ability to use e-tools like emails, blogs, and wikis that enhance digital interaction between two or more individuals (Yalman, 2020) Information and communication technologies enable students to access, share, analyze, and present information gathered from various sources. The integration of information and communication technologies provides students with opportunities to work both individually and in groups, supporting their collaborative and independent learning processes. In this context, the role of ICT within the curriculum is not only to enrich students' learning experiences but also to contribute to the development of teamwork, team spirit, cohesion, and social values, thereby enhancing students' participation and collaboration skills (Pheeraphan, 2013). In this regard, education systems and curricula need to adapt to technological developments and support students' collaborative learning processes. The use of technology in the teaching-learning process provides many benefits. Fundamentally, technology facilitates the teaching and learning process by creating collaborative learning environments that enable the sharing of knowledge and learning experiences. Additionally, it promotes communication among stakeholders (Günüç, 2017). In this process, students learn to take responsibility for their own actions within a framework of equal and shared responsibility. To achieve this, technological tools should be utilized to create a dynamic working environment that fosters positive interdependence among students or between members of study or

class groups. To achieve this, technological tools should be employed to create a dynamic working environment that fosters the development of positive interdependence among members of study or class groups. Additionally, these tools should function as supportive elements in the interaction processes among peers, as well as in the planning, organization, and joint problem-solving processes, without interfering with them (Iglesias Rodríguez; García Riaza & Sánchez Gómez, 2017). The findings of research in the literature indicate that information and communication technologies play an effective role in the teaching of collaboration skills, one of the key competencies of the 21st century (Düzenli Çil & Yılmaz, 2023; Jeong & Hmelo-Silver, 2016; Resta & Laferrière,2007).

An information and communication technology-supported learning environment requires an integrated approach, as it encompasses both pedagogical and technological elements. While a traditional teacher might evaluate a learning environment solely by the physical arrangement of desks and chairs in a classroom, some educators tend to perceive an ICT-supported learning environment merely in terms of its technological infrastructure, such as computer hardware, networked computers, and specific software programs. However, to fully leverage the diverse pedagogical opportunities offered by the current ICT infrastructure, these environments must not only move beyond traditional learning models but also be understood and treated as elements that promote and support more effective learning in line with constructivist learning principles (Richards, 2006).

In collaborative learning, the learning environment is student-centered. In this approach, students take on the role of active participants in their own learning processes and develop problem-solving skills, learning to work collaboratively with their peers. Learning takes place in a meaningful and authentic context, where social and collaborative activities—through which peers play a supportive role in learning—are of great importance (Neo, 2003).

The use of information technologies for course delivery and support offers new opportunities for collaborative learning. Information and Communication Technologies (ICT) in education bring about significant changes in the way we work and learn. Today, tools such as browsers, chat rooms, email, forums, video conferencing, groupware, Lotus Notes, and Microsoft SharePoint Server are widely used (Aiken et al., 2005). In recent years, the opportunities offered by Web 2.0 technologies (Gününç, 2017) and artificial intelligence technologies (Yalçınalp et al., 2024) have been utilized in educational environments. These technologies support learning processes by enabling communication, collaboration, and cooperative activities to be carried out more efficiently and effectively within educational settings.

7. The Use of Web 2.0 Tools

The interaction between human and technology has led to the development of new applications that enable individuals to collaborate with active participation. These applications are categorized under dynamic web technologies known as "Web 2.0 technologies." These dynamic technologies are utilized through various tools, including social media platforms, video-sharing sites, instant messaging applications, virtual museums, Google services, podcasts, wikis, and blogs (Korucu & Yücel, 2015). An especially important aspect of Web 2.0 is cloud applications. These applications do not need to be installed on any specific device; instead, they function through a web browser and an Internet connection (Madar & Abdikadir, 2015).

Among the applications of cloud computing, collaborative service is the most potential application to achieve collaborative learning and can be used to help students complete a learning task in a collaborative way (Huang et al., 2013). Through these tools, it is possible for students to increase their collaborative capacity and manage collaborative learning processes more effectively and efficiently. Web 2.0 technologies are widely used in the field of education, especially because they contribute to the development of 21st century skills such as technology literacy and collaboration skills. These technologies provide teachers and students with the opportunity to collaborate anytime and anywhere, go beyond ready-made templates and allow users to create their own materials (Donmuş Kaya, 2022).

8. Online Learning Tools

Advancements in distance education have strengthened the interaction between teachers and students, facilitated communication processes, and provided a more flexible interaction environment, fostering connections between both parties. Online learning tools help facilitate communication, allow greater access to information, promote new forms of learning, eliminate time and space constraints, and aid in developing skills and competencies (Küçük Avcı & İstanbullu, 2022).

Interaction in online education is divided into two main categories: synchronous and asynchronous. Synchronous learning enables participants to interact at the same time without being physically together through the use of video conferencing and other multimedia tools. In contrast, in asynchronous learning, the interaction between participants takes place in different time periods (Doğan & Seferoğlu, 2024). Collaborative learning method can be effectively supported and applied through online learning tools. By using online document sharing platforms, students can create and share documents on the internet. In this way, it allows synchronous or asynchronous group work (Yeşiltaş, 2017). Platforms where students can plan their online collaborative work and hold meetings include tools such as Google Meet, Zoom, Microsoft Teams, and Skype. Online document sharing and editing platforms can be used to facilitate students' collaborative work, as they are easily

accessible and simplify the collaboration process. Platforms such as Google Classroom, Google Docs, Dropbox Paper, and Coda provide the ability to work on and share the same document.

Olivey (2022) stated that in assessments involving real-world application problems, Google Docs is more effective than pen-and-paper assessments and encourages more collaboration among student groups compared to tools integrated into a learning management system. Similarly, Slone and Mitchell (2014) emphasized that Google Docs encourages students to conduct research on a problem, collaborate with their peers while preparing a document on the issue, and present their findings to a larger group via screen sharing. Another advantage is that the recorded information remains continuously accessible even after the group activity has ended.

9. Conclusion

Developing collaboration skills in education is crucial for preparing students to contribute effectively to their future professional lives, the business world, and society, as well as for helping them adapt to the changing demands of the 21st century. Collaboration, which is one of the skills of the social studies curriculum, is important in terms of understanding the basic dynamics of society and providing active participation. The advancement of the Internet and wireless technologies is transforming educational environments from traditional classroom instruction to collaborative learning processes, enabling groups with shared objectives to work together effectively. The rapid development of digital technologies and online learning tools provides students with opportunities to work in groups and supports students' collaborative skills. Web 2.0 technologies, online document sharing platforms such as Google Docs, DropBox Paper, Coda encourage collaboration by providing students with the opportunity to work and interact on the same document. These tools can be used in any learning and teaching activity, including instructional activities in social studies classes. Students can plan their collaborative work and conduct meetings and interviews through platforms such as Google Meet, Zoom, Microsoft Teams, and Skype. Teachers can integrate these technologies into their course processes to create student-centered and interactive learning environments

Application Example 1

Collaboration-Based Sample Activity Plan

Course Name: Social Studies

Grade level: 5

Learning Themes: Living Together

Learning outcome and Indicators: The ability to interpret the impact of efficient resources use on nature and humans.

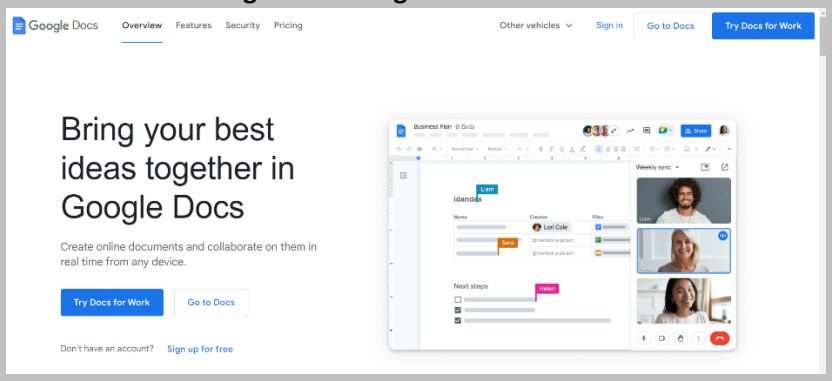
Skills: Collaboration, Communication and Digital literacy

Digital Tools: Google Doc, Google Drive

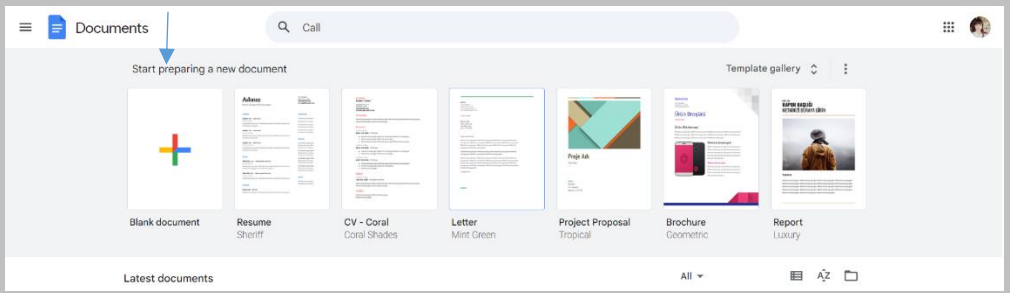
Preparation for the Activity

The teacher provides instructions on the smartboard for students to create a Google account if they do not already have one. After each student creates a Google account, they are given information on how to use Google Docs tools.

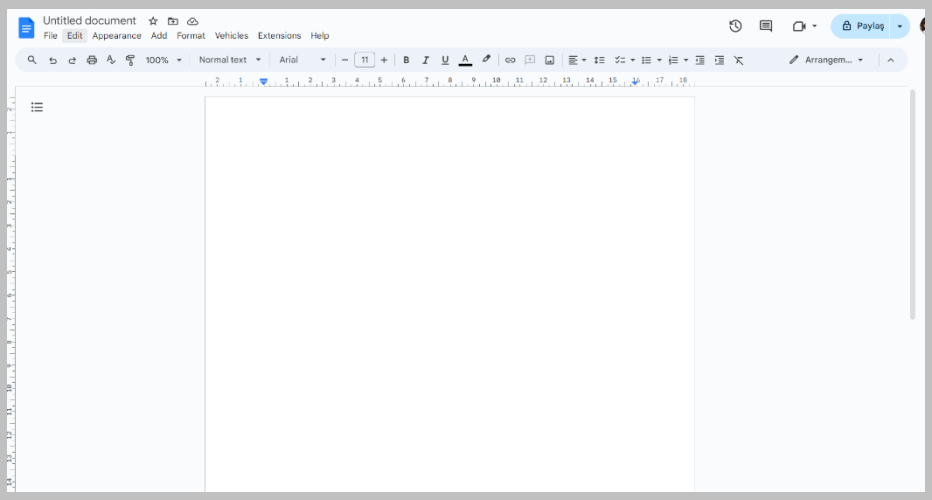
Sign in to Google Docs



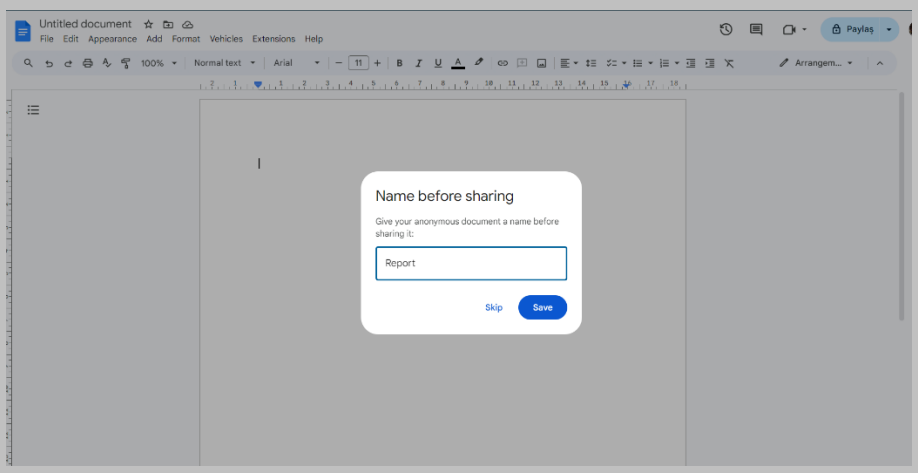
On the document page, select the blank page.



Students can collaboratively prepare their work for the group performance task on the page below.



Students can save their work and share it with group members, collaborating on the file either synchronously or asynchronously.



Context

Instruction

Dear students, as a group, you are expected to prepare a report or a poster on the impact of the efficient use of natural resources such as water, energy, and raw materials on nature and humans. You can make this decision together with your group members. In this process, you will research how resources can be used efficiently and determine the environmental and social benefits of this efficient use. In your work, you will also need to evaluate the damages caused by the waste of resources on nature and the impact of these damages on human life.

Complete your task according to the instructions provided below.

- Research strategies that will ensure the efficient use of resources such as water, energy, and raw materials.
- Identify the benefits of efficient usage for nature and people.
- Investigate the environmental impacts of wasting resources and how these impacts affect human health.
- Collaboratively prepare a poster or report as a group, using the data and information you gathered from your research.
- Add visuals, graphs, and key information to your report or poster, indicating the effects of efficient use of water, energy, and raw materials on nature and people.

Group Collaboration

The report or poster will be prepared using Google Docs. During meetings held in class, the working process will be determined, and tasks will be divided among group members

Assessment of the Activity

Group Assessment

First name/Last name :.....

Name of the group :.....

Subject of the study :.....

Dear students,

Assess the work you have done with your group based on the following criteria.

Assessment Criteria Group members assumed their responsibilities by distributing tasks in a fair and balanced manner.	**Poor** **1**	**Average** **2**	**Good** **3**	**Very Good** **4**	**Score**
Effective Collaboration Group members worked together efficiently toward a common goal by collaborating effectively.					
Effective Communication Direct, open, and constructive communication was established among the group members, and ideas were conveyed effectively					
Innovative Thinking Group members developed innovative approaches and proposed alternative solutions during the study process.					

Decision-Making Competence Group members made effective decisions and produced solutions in the face of the problems they encountered.					
Supportive Attitude Group members supported their teammates by providing guidance and offering necessary during the study.					

Application Example 2

Collaboration-Based Sample Activity Plan

Course Name: Social Studies

Grade level: 7

Learning Themes: Our Common Heritage

Learning outcome and Indicators: The ability to interpret the impact of efficient resources use on nature and humans.

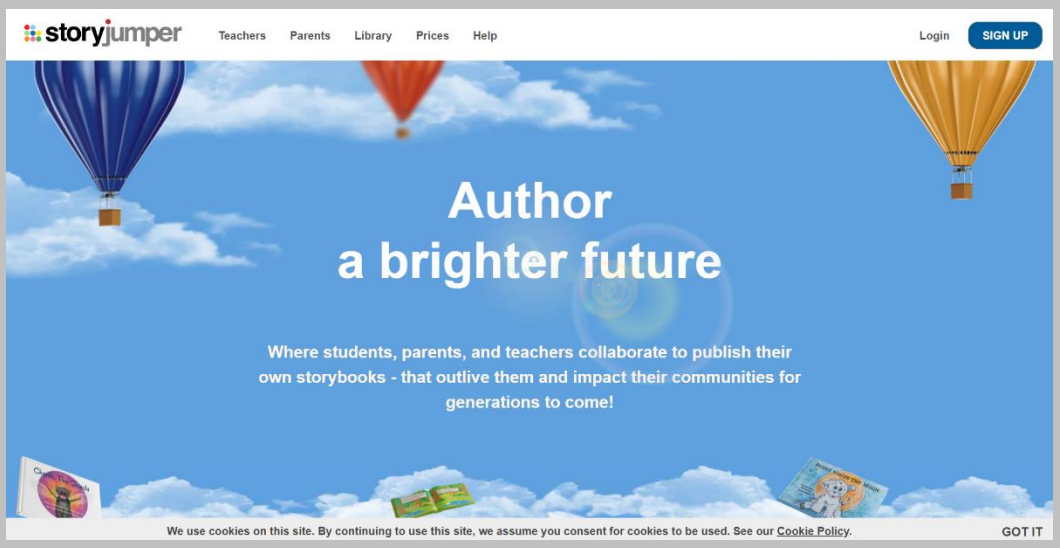
Skills: Collaboration, Communication and Digital literacy

Digital Tools: https://www.storyjumper.com/

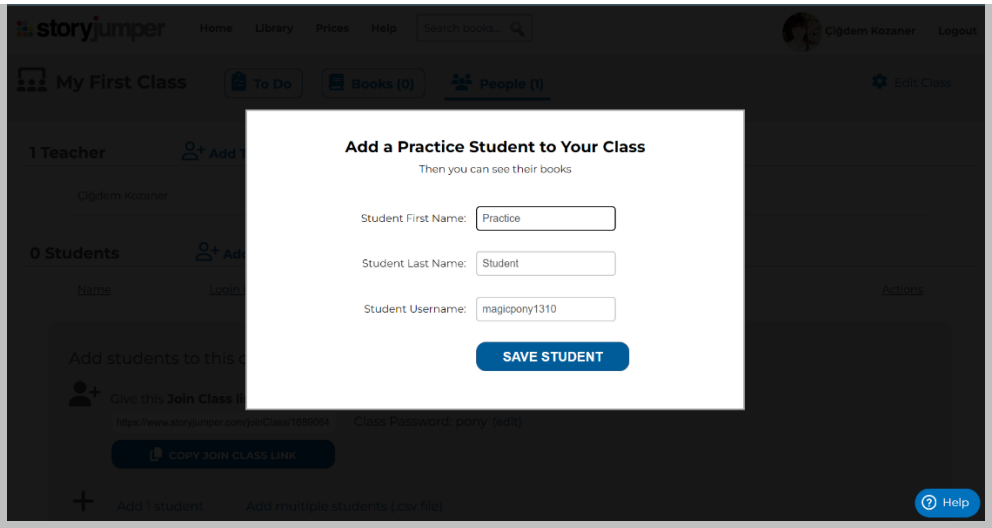
Preparation for the Activity

The teacher provides the necessary instructions to the students on how to log into and use the StoryJumper platform through the smartboard. It is explained that students can log into the platform using their existing Google accounts, and detailed guidance is provided on the usage process.

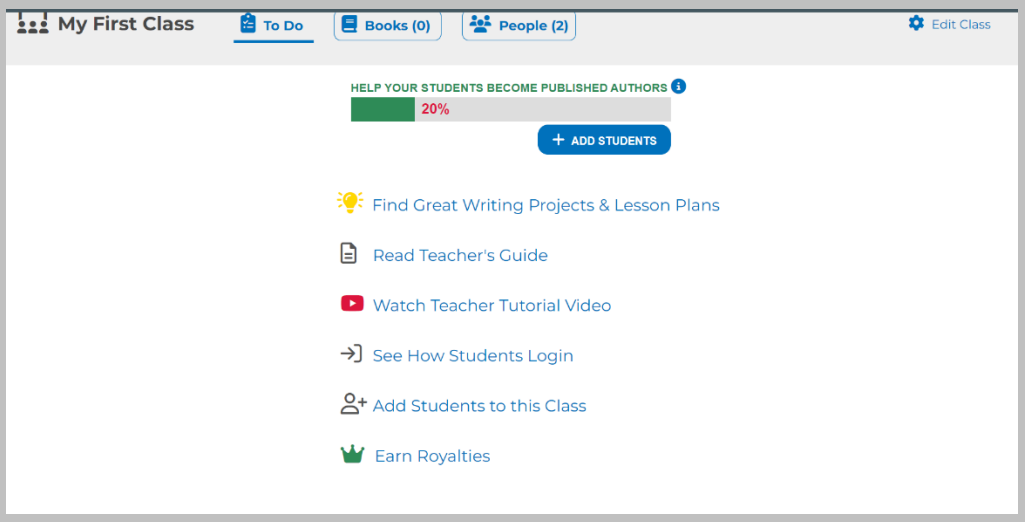
Sign in to StoryJumper



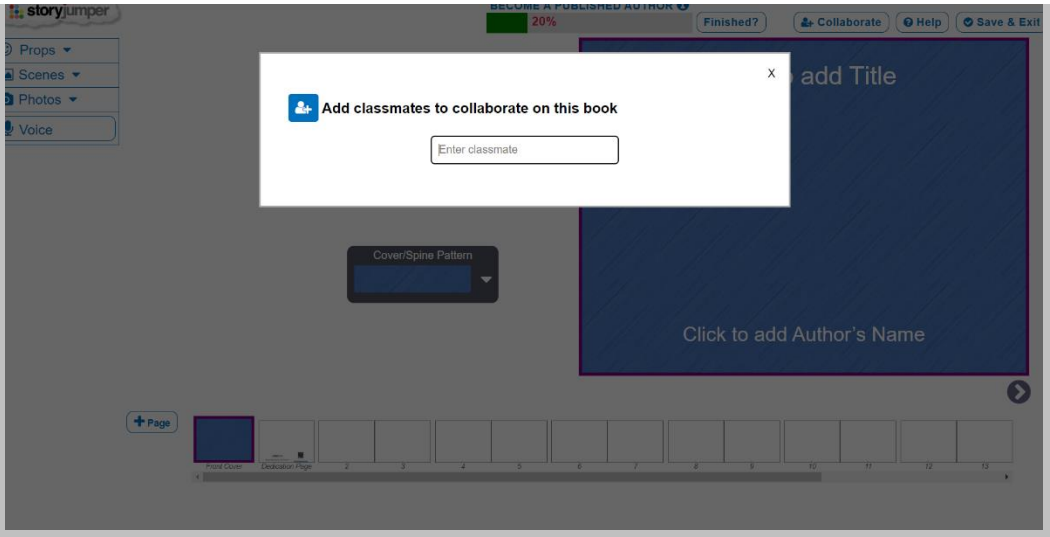
The teacher creates a class and save the students.

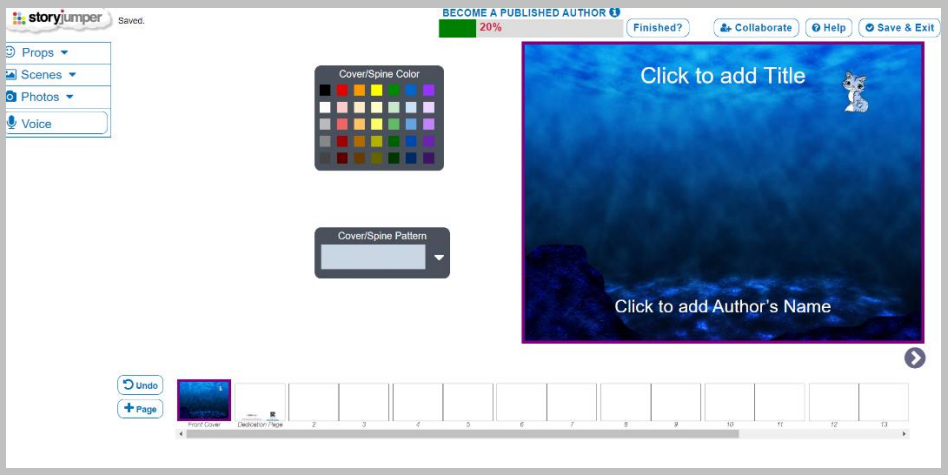


After the class is created, a unique code is generated to send an invitation to the students. This code is shared with the students to allow them to join the class.



After creating the class, each student joins the class through their own account. The teacher can guide the story projects within the class and organize group work. If students are working in groups, separate story projects can be created for each group. By opening a new project for each group, the relevant students can be assigned to that project. Through the StoryJumper platform, students can share and edit the story-writing process both individually and as a group.





After the story is completed, each group can present their story as a digital book.

Context

Instruction

Dear students, based on the topics we covered in the "Our Common Heritage" unit, write a story that describes the contributions of the first Turkish states established in Turkistan to our civilization. In your story, blend your imagination with the societal, cultural, economic, scientific, and artistic contributions of these states.

Your story can be told from the perspective of a child living in these states. Your character can witness the cultural structure and development processes of the state at that time and interact with the state administrators, people or soldiers. In your story, you can describe in detail the social and cultural life of the people living there, including their traditions and beliefs.

First, carefully read the following instructions and create your story plan in class. At home, log into StoryJumper and access your group's page. Based on the plan you created in class, divide the tasks and start writing your story together. You have one week to complete the story. Make sure that each group member contributes to the story.

- **Complete your task according to the instructions provided below.**

When creating your story, consider the following questions: (5Ws and 1H)

Who: Who are the characters in your story? Which important people and characters contribute to the narrative?

What: What developments and innovations are presented as contributions of these states to civilization?

Where: In which geographical region does your story take place?

When: During which period is your story set?

Why: Why did these states make such contributions?

How: How were these contributions made?

While writing your story, use the information you have learned during the lesson and from the sources you researched. Create a creative story while staying true to historical facts.

Group Collaboration

The report or poster will be prepared using Google Docs. During meetings held in class, the working process will be determined, and tasks will be divided among group members.

Assessment of the Activity

Story Project Evaluation Rubric					
Assessment Criteria	**Excellent (4)**	**Good (3)**	**Fair (2)**	**Needs Improvement (1)**	**Achievement Score**
1. Historical context	The story fully and comprehensively reflects the contributions of the first Turkish states established in Turkestan. It contains information that aligns with historical facts.	The contributions of the Turkish states are accurately described, though some details may be missing or superficial. Historical events are correctly conveyed.	The contributions of states are superficially described, historical information may be incomplete or partly inaccurate. General information provided.	The story contains little historical information or presents inaccurate information. The contributions of the Turkish states are not sufficiently reflected.	
2. Creativity and Storytelling	The story is written in a creative and fluent manner. It is engaging, well-structured, and the plot is original and compelling.	The story is creative and fluent, but the plot and character development could have been more detailed. Overall, the narration is good.	The story is somewhat creative and fluent, but the plot and character development are lacking. The narration is weak.	The story is partly imaginative and flowing, but lacks plot and character development. Narration is weak	
3. Structural Organization and Story Planning	The story has clear introduction, development, and conclusion sections. Structurally, it is well-organized and follows a coherent plan.	The story generally follows a good structure, but there may be some shortcomings in the introduction, development, or conclusion sections.	The story has some structural deficiencies, with the introduction, development, and conclusion sections not being clearly defined. The plan has not been fully followed.	The story has some structural deficiencies, with the introduction, development, and conclusion sections not being clearly defined. The plan has not been fully followed.	
4. Group Work and Collaboration	Each group member contributed to the story and collaboration was excellent.	Group members generally collaborated, but some members	Collaboration between group members was limited, some members did	Group collaboration was weak, with most tasks handled by one or two	

	The division of tasks was balanced and efficient.	may have contributed less. Task allocation is partially balanced.	not participate sufficiently. Task allocation may be unbalanced.	members. Contribution distribution was unfair.	
5. Timely Completion of the Story	The project was completed and delivered on time within the given deadline.	The project was completed on time, but there may have been minor delays.	The project was delivered late and exceeded the deadline	The project was delivered substantially late and there were serious timing problems.	

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